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STAGING PLACES AS PERFORMANCES

CREATIVE STRATEGIES FOR ARCHITECTURE

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SUMMARY OF THESIS

This thesis is about creative strategies for staging places as performances. To remain viable in the rapidly changing technological and social context, architecture needs to extend its engagement with research, reappraise its fundamental goals and develop creative strategies adequate to new challenges.

However, utilisation of research in design disciplines is still immature and the methodologies of this utilisation remain a matter of controversy and active debate. In particular, the potential of cross-pollination between designing and research requires further clarification. This thesis addresses this need by developing a methodological approach that combines participant observation and investigative designing. Utilising these methodologies, this thesis considers several case-studies, including interactive installations and virtual environments.

Engagement with case-studies through participant observation and investigative designing in this thesis motivates a discussion that reinstates place as the focus of architectural practice. Existing discourse and practice in architecture often assume retrograde, romantic, essentialist and exclusionary understandings of places, for example as singular, bounded and static. By contrast, this thesis highlights an open and flexible vision of places as performances. Considering the possible roles of architectural designing in place-making, it suggests

that architects cannot produce ready places but can engender place-making performances and influence their growth with provocative, open and collaborative creative-design strategies.

Having established the case for distributed, polyphonic, campaigning creativity in place-making, this thesis considers whether design computing can support its performative needs. Commonly, researchers and practitioners in architecture express concerns that design computing can hinder human creativity. By contrast, this thesis demonstrates that design computing can support distributed creativity by staging multiplicious, open, flexible, idea- and insight-generating participatory exchanges. In the process, this thesis considers interactive cinematography and procedural designing as place-making actions. This re-conceptualization demonstrates that design computing can usefully support creative place-making and sometimes be indispensable for its success.

This thesis contributes to knowing by 1) utilising and presenting an unorthodox methodological approach to architectural research; 2) presenting an approach to understanding and making of places novel to the field of architecture; and 3) re-conceptualizing innovative design-computing as an important creative resource for place-making.

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PREFACE

My educational background is in architectural design and fine art and I have practiced for several years as an architect. Having studied new media and computer-aided design, I also have considerable experience in three-dimensional modelling, animation, compositing and the design of interactive, virtual environments. The research presented in this thesis is a natural progression of my interests in the emergence and making of new, technology-saturated places as well as in the creative possibilities offered to architecture by the advancements in computing.

I conducted my research at The Digital Studio, a research division of the Department of Architecture, University of Cambridge. Collectively, the group explores issues concerning cross-influences between various forms of the moving image and architecture including the mirror concepts of "narrative expressive space" and "spatially expressive narrative" (Penz, 2003, 2004). Within this environment, I took part in a number of collaborations that led to the development of the theoretical perspectives and case-studies presented in this thesis.

I could not have completed this thesis without the generous support of many people. In particular, I am grateful to my supervisor, François Penz for the many interesting research-work opportunities and for his good counsel. I am thankful to Giorgos Artopoulos and Michael Nitsche, who were my insightful, supportive and enthusiastic

collaborators on several of the projects discussed in this thesis. Other colleagues who offered suggestions, read my drafts and stimulated my research through their own creative work included Stavros Alifragkis, Elliott Dumville, and, especially, Maureen Thomas whose ideas on drama and narrative have usefully informed my thinking and practice. I thank Margaret Young for her encouragement, help and advice—on the numerous drafts of my papers, thesis and beyond. I am also grateful to Peter Carl, Laur Vallikivi and Katharine Young for the educational discussions and comments on my writing. I realise that there are many other people who indirectly but essentially supported this thesis as well as my other endeavours. Thank you everyone.

A number of organisations have enabled my doctoral research by supporting it financially. These include the Higher Education Funding Council for England, the Engineering and Physical Sciences Research Council, King's College, Cambridge, and the University of Cambridge.

Declaration of authorship

As mentioned above, several of my case-studies were collaborative projects, and I explain my involvement with them in my discussion of the methods in practice (p. 53) and in the case-study descriptions included in the appendix. The analysis and interpretation of these case-studies for the purposes of this dissertation is the result of my own work only.

I have submitted no portion of the work referred to in this thesis in support of an application for another degree or qualification of this or any other university or other institute of learning. Discussions of case-studies and concepts included in this thesis have previously appeared in a number of publications and other public events.

Book chapters

Roudavski, Stanislav and Penz, François (in press) 'Spatial Context of Interactivity', In *Interactive Convergence: Interdisciplinary Research in Multimedia*, ed. by Scott P. Schaffer and Melissa L. Price (Amsterdam: Rodopi Press)

Journal articles

Artopoulos, Giorgos and Stanislav Roudavski [in alphabetical order] (2006). 'A Performative Situation: Prague Biennale Pavilion', *Interfaces*, 68, pp. 10–13

Artopoulos, Giorgos and Stanislav Roudavski [in alphabetical order] (2006). 'It's a Parasite! Prague Biennale Pavilion', in *Metalocus*, 18

Nitsche, Michael, Stanislav Roudavski [in alphabetical order] with Maureen Thomas and François Penz (2002). 'Narrative Expressive Space', *SIGGROUP Bulletin*, 23, 2, pp. 10–13

Roudavski, Stanislav (2005). 'ISEA 2004: Layers of Performance', *NY Arts Magazine*, 10, 1/2

Chapters in conference proceedings

Artopoulos, Giorgos and Stanislav Roudavski [in alphabetical order] with François Penz (2006). 'Adaptive Generative Patterns', in *Proceedings of The Second International Conference of the Arab Society for Computer Aided Architectural Design (ASCAAD 2006)*, ed. by Jamal Al-Qawasmi and Zaki Mallasi (Sharjah: The Arab Society for Computer Aided Architectural Design (ASCAAD)), pp. 341–362

Nitsche, Michael and Stanislav Roudavski [in alphabetical order] (2002). Maureen Thomas and François Penz, 'Building Cuthbert Hall Virtual College As a Dramatically Engaging Environment', in *Proceedings of the Participatory Design Conference 2002*, ed. by Thomas Binder et al. (Palo Alto: CPSR)

Nitsche, Michael and Stanislav Roudavski [in alphabetical order] with Maureen Thomas and François Penz (2003). 'Drama and Context in Real-Time Virtual Environments: Use of Pre-Scripted Events as a Part of an Interactive Spatial Mediation Framework', in *Proceedings of 1st International Conference on Technologies for Interactive Digital Storytelling and Entertainment*, ed. by Stefan Göbel et al. (Darmstadt: Fraunhofer IRB Verlag), pp. 296–310

Roudavski, Stanislav and Giorgos Artopoulos (2006). 'Digital Design Techniques for Synthetic Systems', in *Synthetic Landscapes: Proceedings of the 25th Annual Conference of the Association for Computer-Aided Design in Architecture (ACADIA 2006)*, ed. by Gregory A. Luhan, Phillip Anzalone, Mark Cabrinha and Cory Clarke (Mansfield, OH: Bookmasters)

Roudavski, Stanislav and Giorgos Artopoulos [in reverse alphabetical order] with François Penz, (2006). 'Digital Design Techniques for Adaptable Systems: Prague Biennale Pavilion', in *GameSetAndMatch II: The Architecture Co-Laboratory on Computer Games, Advanced Geometries and Digital Technologies*, ed. by Kas Oosterhuis and Lukas Feireiss (Rotterdam: Episode Publishers, 2006), pp. 478–486

Roudavski, Stanislav and François Penz (2003). 'Space, Agency, Meaning and Drama in Navigable Real-Time Virtual Environments', in *Digital Games Research Conference 2003 Proceedings*, ed. by Marinka Copier and Joost Raessens (Utrecht: Utrecht University)

Roudavski, Stanislav and François Penz (2003). 'Spatial Context of Interactivity', in *Interactive Convergence: Critical Issues in Multimedia*, ed. by Scott P. Schaffer and Melissa L. Price (Oxford: Inter-Disciplinary Press)

Conference posters

Roudavski, Stanislav and Artopoulos, Giorgos [in reverse alphabetical order] (2006). 'A Performative Situation', in *International Symposium on Electronic Art (ISEA 2006)*

Roudavski, Stanislav and François Penz (2003). 'Context Design and Cinematic Mediation in Cuthbert Hall Virtual Environment', in *Virtual Storytelling; Using Virtual Reality Technologies for Storytelling Second International Conference, ICVS 2003*, ed. by Olivier Balet, Gérard Subsol and Patrice Torguet (Heidelberg: Springer), pp. 112–115

Catalogue entries

Artopoulos, Giorgos and Stanislav Roudavski [in alphabetical order] (2005). 'It's a Parasite!', in *International Biennale of Contemporary Art 2005 - National Gallery in Prague*, ed. by Ivan Hartmann, Svetlana Michajlová, and Katarína Rybková (Prague: Národní galerie v Praze), pp. 122–123

Roudavski, Stanislav and Giorgos Artopoulos [in reverse alphabetical order] (2006). 'Digital Design Techniques for Synthetic Systems', *the 25th Annual Conference of the Association for Computer-Aided Design in Architecture (ACADIA 2006) Exhibition Catalogue*

Image credits

Roudavski, Stanislav (2006). Digital rendering on the cover of the Interfaces journal, project by Stanislav Roudavski and Giorgos Artopoulos (in reverse alphabetical order), *Interfaces*, 68

Competitions

ACADIA/IJAC 2007 Cover Image Competition; Hosted by the Association for Computer-Aided Design in Architecture (ACADIA) in collaboration with the International Journal of Architectural Computing (IJAC); It's a Parasite (digital rendering); honourable mention

Exhibitions, festivals, lectures and other events

2007

Generative Art 10th International Conference; poster presentation; Milano, Italy

Power and Space International Conference: Transforming the Contemporary City; poster presentation; Camridge, UK

2006

3D Event: London Technology Network; poster presentation; London, UK

Compendium, an exhibition at the Royal Institute of British Architects (RIBA); invited participation; London, UK

Futuresonic 2006: Urban Festival of Electronic Music and Arts; invited presentation and panel participation in Urban Play Symposium, Social Technologies Summit; panel title: *Interactive Architecture (Built on an Internet of Things)*; Manchester, UK

River's Edge Film Festival; film and project presentation; Paducah, KY, USA

Rylands Art Prize Exhibition; artwork presentation; King's College, Cambridge, UK

Synthetic Landscapes: the exhibition of the 25th Annual Conference of the Association for Computer-Aided Design in Architecture (ACADIA 2006); film and project presentation; Louisville, KY, USA

Technology Matters, conference; invited presentation; Ecole Nationale Supérieure d'Architecture Paris-Malaquais, Paris, France

ZeroOne San Jose: A Global Festival of Art on the Edge & the Thirteenth International Symposium of Electronic Art (ISEA 2006), Interactive City Symposium; project poster and film presentation; San Jose, USA

2005

Design Away Day Panel; invited presentation; National Health Service (NHS), Design Excellency Unit; The BALTIC Centre of Contemporary Arts, Newcastle, UK

It's a Parasite; pavilion and interactive performative installation at the International Biennale of Contemporary Arts (IBCA), Czech National Gallery, Museum of Modern Art, Prague, Czech Republic

Olhares de Outono, 6th International Festival of Digital Arts; film presentation and three invited lectures; Centro de Investigação em Ciências e Tecnologias das Artes (CITAR), Universidade Católica Portuguesa, Fundação para a Ciência e a Tecnologia (FCT); Porto, Portugal

People, Places, Prosperity; a European seminar on sustainable urban development involving practitioners and agencies specialising in urban development, environment, regeneration, architecture and planning, policy-makers, academics and funding bodies; Scotland Europa, British Council Brussels and The Royal Institution of Chartered Surveyors (RICS), Scotland House Brussels, Belguim

2004

Creative Media Production for Mobile Devices, idea-development workshop; invited participation; Nokia, Cambridge University Moving Image Studio (CUMIS), Centre for Applied Research in Educational Technologies (CARET), Cambridge, UK

Crossovers in Audiovisual Arts and Interactive Media; international symposium invited presentation; University of Art and Design & Crucible Studio; Helsinki, Finland

2003

Dancers and Creative Movers Workshop; invited workshop contribution; AccessArts; Tate|Modern; London, UK

Good City Conference; invited presentation; Churchill College, University of Cambridge, UK

Reading the Runes; film presentations; Tate|Modern; London, UK

RESPOND!!! International Festival, Network Exchange Symposium: "Research/Practice//Practice/Research"; invited lecture; Cambridge, UK

Space Workshop; invited idea-development and workshop contributions; AccessArts; Cambridge, UK

Synthesising Reality Seminar; invited lecture; The British Academy of Film and Television Arts (BAFTA); London, UK

Statement of length

This thesis, including footnotes, references and text within tables but excluding captions, appendices and bibliographies, contains approximately 79,700 words and is, therefore, within the 80,000 word-limit set by the Degree Committee of the Department of Architecture and History of Art.

Additional visual material

To offer an extended impression of my investigative-designing case-studies, I supplement their descriptions in this thesis with a DVD disk that contains several moving-image representations referring to some of my case-studies.

Another DVD disk attached to this thesis includes a movie about *The Parasite* project. It is intended as an additional illustrative example of the types of visual material collected for this case-study as well as an expressive piece giving insights into the emotional environment of the project.

Viewing of these movies is optional.

KEY TERMS AND CONCEPTS

This section provides brief descriptions of the terms and concepts important for the subsequent discussion. These descriptions are not definitive or exhaustive. Many phenomena discussed in this thesis such as place, design, architecture and creativity are all what Gallie (1956a; Gallie 1956b, pp. 167–198) called "essentially contested concepts". Stakeholders disagree on the meaning of these phenomena and have constructed many complementary, parallel or incompatible theories and practices. The discussion on the nature of these concepts and on the meaning of the corresponding terms is unlikely to end until interested parties continue their involvement.

This glossary indicates where my usage differs from that of common language or alternatives co-existing in academic and professional literature. My subjective considerations of appropriateness and feedback from my colleagues bounded the extent of these explanations. To compensate for the necessary brevity and to relate my descriptions to the ongoing discourse, I provide references to the existing literature that discusses concepts kindred to mine. While some of my descriptions risk pre-empting and over-condensing arguments presented in the subsequent chapters, I felt they were necessary as approximate boundaries able to provide bearings for the reader and help to prevent possible misinterpretations of the subsequent text.

actant

Actants are social constructs with rhizomic structure bound by punc-

tualisation. An actant is something that acts. Any entity can be an actant if other actants grant it an activity. Actants do not need to be human. People, places or technical entities can all perform as actants. I also use the terms participants, stakeholders, constituents and users to describe actants in particular situations.

Cf. Latour (2005).

affordance prescription

Affordances are opportunities for action offered by some actants and perceived or co-constructed by other actants. Prescriptions are limitations or inducements imposed by actants onto other actants.

Cf. Gibson's (1986) usage of the term in his "environmental perception" approach. Also cf. Latour (2005, p. 72) on how actants can "authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid and so on."

architecture

Architecture is one of many designerly practices. As such, it has many characteristics typical for designing in general (see the entry for "design, designing"). This thesis particularly emphasises that "architecture needs to be thought of less as a set of special material products and rather more as range of social and professional practices that sometimes, but by no means always, lead to buildings." (Rampley, 2005, p. 108)

closure

Closure is a process towards equilibrium or a state of equilibrium where participants agree on punctualised, "self-evident", character of a place (or any other actant, e.g., an artefact, an institution or a scientific fact) or where one interpretation becomes dominant (e.g., see Pinch and Bijker, 1984). Also, see Law's (Law, 1989, p. 111) definition stating that "the stabilization of artifacts is explained by referring to social interests that are imputed to the groups concerned and their differential capacity to mobilize resources in the course of debate and controversy. Social constructivists sometimes talk of this process as one of 'closure' Closure is achieved when debate and controversy about the form of an artifact is effectively terminated."

My approach emphasises that the true closure or stabilisation never occur in places. Instead, participants achieve dynamic stability of places via a performative consensus.

communities of practice

Communities of practice are "created over time by the sustained pursuit of a shared enterprise." (Wenger, 1998, p. 45) They are communities of interaction and learning and, in normal circumstances, all humans participate in multiple communities of practice. Also, see Lave and Wenger (Lave and Wenger, 1991).

The term 'communities of practice' refers to the phenomena that others discussed as "communities of culture" (Clark, 1996, p. 105), "socially distributed cognition" (Hutchins, 1995; Lave, 1988), "discourses" (e.g., see Foucault, 1972, 1994), "discourse communities" (Berkenkotter and Huckin, 1995; Miller, 1984), "thought collectives" (Fleck, 1979), "cultures" (Geertz, 1973; 1983), "practices" (Bourdieu, 1977, 1984, 1990), "actor-networks" (Latour, 1987) and "activity systems" (Engeström, 1987; Leont'ev, 1979; Wertsch, 1998).

creativity

I adopt a consensual (social) definition of creativity stating that "a product or response is creative to an extent that appropriate observers [such as experts in the domain] independently agree it is creative." (Amabile, 1982, p. 1001; Amabile 1983; Amabile, et al., 1996)

It is common in socio-cultural approaches to creativity to insist on both novelty and appropriateness of a creative product (Sawyer, 2006, pp. 27–29; Simonton, 1999, p. 5–6). A "creative idea" is appropriate when it is "recognised as socially valuable in some way in some community" (Sawyer, 2006, p. 27).

design
designing

My understanding of designing emphasises the usefully plural character of designing. According to Buchanan (1992, p. 5), "[n]o single definition of design [...] adequately covers the diversity of ideas and methods gathered together under the label." Moreover, Buchanan and Margolin (1995, p. xii) argue for "the value of radical systematic pluralism [...]" in design research and practice. Friedman's (2000) taxonomy of design practices provides an illustrative example demonstrating the expansive scope of designerly engagements.

Similarly to several researchers (Durling and Niedderer, 2007; Hubka and Eder, 1996; also, cf. Love, 1998), I prefer to use the term designing to emphasise the processual character of place-making activities. I also take this term to mean "the entirety of all design activities."

(Hubka and Eder, 1996, p. 4)

Designing is the process of making proposals for change or imagining future situations. Usually, designing is a goal-oriented process that "involves solving problems, creating something new, or transforming less desirable situations to preferred situations." (Friedman, 2002, p. 507). Commonly, designing deals with complex, ill-defined and dynamic situations such as those discussed as "wicked problems" (e.g., see Buchanan, 1992; Coyne, 2005; Krippendorff, 2006; Rittel, 1972; Rittel and Webber, 1973).

Designing is also a social practice or a field that encompasses multiple disciplines and carries symbolic value. Functionalist definitions of designing struggle to accommodate the great variety of its activities. As a social practice—designing is what designers do. At the same time, designing occurs in everyday life and many people apart from design professionals engage in design practices. On designing as a social practice that involves communication, negotiation and compromise-making, see Bucciarelli (1994) and Horgen et al. (1999).

Designing also constitutes a unique form of knowing. For example, Buchanan (1992, p. 5) argued that as a rapidly growing field that constantly gains extra dimensions, designing deserves recognition not as a trade or profession but as a "new liberal art of technological culture".

generative form-finding

Generative form-finding is a design methodology able to support the creative process and yield unusual and complex geometries. Engineers use form-finding as an optimisation technique. In architecture, Antonio Gaudi and Frei Otto pioneered the use of form-finding strategies for organically-shaped structures optimally reacting to the forces of gravity. My understanding of form-finding is wider and includes an extensive variety of search-like open-ended methodologies. For comparison of approaches to form-finding and on the use of parametric design in engineering and architecture, see Woodbury et al. (2006).

habitus

Habitus is an accumulation of acquired habits, bodily skills, styles, tastes, and other tacit knowing (cf. Bourdieu, 1990a). I extended this concept to include non-humans. While non-humans usually cannot

have expertise or tastes in the same way humans can, they can similarly perform social actions constrained by their accumulated history.

innovation

Innovation constitutes an adoption of new ideas or behaviours. "The innovation can be a new product, service, technology, administrative practice or research finding." (Hage, 2005, p. 71)

I employ a practice-centred understanding of innovation according to which "innovation has many agents and [...] the process of innovation is distributed in time, space, and across groups that use technology for different purposes." (Tuomi, 2006, p. 10)

inscription

Inscription is designer's intent built into an object, a building or a place as a program of action. Inscribed rules or meanings prescribe the co-performances of actants engaging with the designed entity. Designers use inscriptions to ensure that intended functions of an entity occur without the presence of the designer. Inscriptions can take multiple forms—for example, textual, visual or structural. Examples of such objects include seatbelts or doors (Latour, 1992, pp. 225–258).

Apart from the primary program of action, there can be many alternative programs afforded by inscribed entities without designers' intent or awareness. Alternative programs can adopt a variety of relationships to the primary program including support, subversion, ambivalence or ignorance. If an alternative program grows in importance, participants can sometimes post-legitimise it as primary.

Cf. Akrich (1997; 1997), Latour (1987, 1992) or Law (2004).

investigative designing

Following Durling and Niedderer (2007) along with Rust (2003, 2004), this thesis uses the term "investigative designing" in preference to such terms as "practice-based research", "practice-led research", "research through practice", "practice-as-research", "design-research", "art-research", "art-based-research", "art-led-research", "studio research", "performative research" and so on because these latter terms have already accumulated a history of controversial and ambiguous usage.

In my understanding, investigative designing incorporates reflective research initiated in practice, responding to the needs of prac-

titioners, aimed to make processes of practice accessible to others and carried out through methodologies familiar to practitioners (cf. Franz, 2000; Gray and Malins, 2004; Haseman, 2006). Examples include practice-led research, and so on.

Also, cf. Schön's (1983) concept of reflective practitioner.

participant observation

"There are several different conceptions of participant observation." (Jorgensen, 1989, p. 7) Moreover, "it is not entirely clear [...] what is involved with the humanistic methodology of participant observation. There are at least two reasons for this situation. One, practitioners of participant observation have resisted formulating definitive procedures and techniques. Its practice has been regarded as artful and inappropriate for any kind of linear, mechanical presentation. [...] Two, even when the methodology of participant observation has been discussed explicitly and presented in the form of textbooks, a fairly diverse set of characteristics have been emphasized. Dimensions such as the insiders' world of meaning, the natural environment of daily life, gaining entree, developing relationships, cultivating informants, participating, observing, and other forms of gathering information, logics of discovery and induction, and interpretative theorizing have received selective and differential treatment [...]." (Jorgensen, 1989, p. 8)

Participant observation approach stipulates that "direct involvement in the here and now of people's daily lives provides both a point of reference for the logic and process of participant observational inquiry and a strategy for gaining access to phenomena that commonly are obscured from the standpoint of a nonparticipant." (Jorgensen, 1989, p. 9)

Many researchers see participant observation as the foundational method of ethnographic, anthropological and social research. As a cover term, participant observation subsumes the notions of fieldwork as well as formal and informal interviewing (DeWalt and DeWalt, 2002, p. 2). Also, cf. Agar (1996) or Schensul et al. (1999).

place

While there exist various efforts that distinguish or contrast place and space, the discourse on these concepts often uses these two terms in-

terchangeably. I chose to use the concept of place in preference to that of space as my "representational strategy" (Crang and Thrift, 2000, p. 1). In this preference, I follow an established tradition influenced by phenomenology and avoid a clash with multiple interpretations of 'space' in architectural discourse where the latter term is one of the most popular concepts.

Where I use the term "place", many researchers chose to say space or use such variants as "space-time" or "space-movement". For example, Thrift's definition of "space" is close to my understanding in stating that "[a]s with terms like 'society' and 'nature', space is not a commonsense external background to human and social action. Rather, it is the outcome of a series of highly problematic temporary settlements that divide and connect things up into different kinds of collectives which are slowly provided with the means which render them durable and sustainable."

I understand place as social construction that is a dynamic, multiplicious and fluid enactment of relationships between multiple heterogeneous actants. For an elaboration of this definition, see Performative-Place Approach and Making of Places chapter below (p. 150).

performance

Performance is a collaborative process of actuating relationships. Performance can take multiple cultural forms and researchers have approached such diverse cultural encounters as rituals (Schechner, 2003), everyday social interactions (Turner, 1988), politics (Butler, 1988), economy (Pine, II and Gilmore, 1999), theatre or even architecture (Kolarevic and Malkawi, eds, 2005) and research (Haseman, 2006) as types of performances.

Cf. McKenzie's (2001, pp. 3–26) types of "organisational", "cultural" and "technological" performance or Schechner's (2003) "performance studies".

procedural designing

Procedural designing is an approach in architectural practice that emphasises the use of processes, sequences or flows of data. Modifications of parameters in procedural design can propagate through assemblies allowing easy readjustments and versioning.

Related approaches include parametric modelling, e.g., see Sza-

lapaj (2001) or Building Information Modelling, e.g., see Eastman (2006). Parametric modelling that is now common in engineering is only making its first steps in architectural design (cf. Woodbury, et al., 2006). Practitioners and software developers promote parametric-associative modelling as an economically efficient way of designing, e.g., see Frazer (2006). Instead of focusing on money-saving benefits of procedural approaches, I am interested in the ways they can support negotiatory, iterative, open design modes.

punctualisation
black-boxing

Punctualisation is a process of stabilisation in which actants begin to appear as unities with set prescriptions and affordances. Such appearances hide complex, relational structures of actants. The concept of punctualisation is analogous to that of object-orientation or black-boxing in computer programming.

A technological object turns into a punctualised black box when stakeholders see it in the same way so that the designer-inscribed usage becomes part of the object's structure. For authorless entities, such as cities or weather, punctualisations emerge as cultural narratives. In both cases, punctualised entities help to hide the complexity of phenomena enabling their easy utilisation and making them sharable. Punctualisation can also function as an oppressive device when the dominant inscription is in conflict with a performance of a particular actor. This conflict can be between creators and users or between majority and minority groups.

Punctualisation is a common concept in discussions of computational or technological objects, e.g., see Law (1992, 1991) or Latour (1999b). While my usage is new in relationship to places, precursor concepts appeared in environmental psychology. E.g., cf. the concept of "synomorphy" or fit between behaviours and objects in an environment proposed by Barker (1968). In architecture, Alexander's (1977) pattern language is a relevant predecessor and so are some of the examples discussed by Hillier (1996). The similarity between punctualisation in technological objects and in places is clearer in some cases because certain components of places such as windows, rooms or buildings are easily recognisable as technological objects.

Cf. Akrich (1997), Callon (1986) or Latour (1987, 1992, 1999). Also, cf.

the concept of schemata in Dennett (1993) or Johnson (2004).

rhizome assembly collective

Rhizomes are gatherings of enacted relationships between heterogeneous actants such as objects, places, technologies, humans, texts, symbols and concepts. All social entities are rhizomes irrespective of their existing associations with social, technical or natural worlds. Places are a characteristic example of particularly complex rhizomes. Forms of rhizomes are subjective interpretations constructed by individuals or groups of people.

Cf. Latour's concepts of "group", "assembly" and "network" that he discussed in relationship to "actor-network theory" (e.g., see Latour, 2005). Also see his alternative term of "actant-rhizome ontology" (Latour, 1999a).

Assembly or collective are parallel terms that emphasise the necessary process of establishing and maintaining connections through negotiations, conflicts and agreements. In my usage, assemblies and collective can include objects, humans as well as their negotiations, conflicts and agreements. For similar usage, see Latour (2004) in relationship to political ecology or Yaneva (2003) in relationship to installation art.

space

Crang and Thrift (2000, p. 1) note that "[s]pace is the everywhere of the modern thought [and that] [t]he problem is not so much that space means very different things—what concepts do not—but that it is used with such abandon that its meanings run into each other before they have been properly interrogated." Insisting, as I do, on a distinction between space and place is impossible without clarifying the terms because of their wide, contrasting, contested and even unrelated usages. As Kuhlke (2006, p. 441) reports, "[t]here are absolute, abstract, architectural, concrete, discursive, material, performative, produced, relational, relative, representational, social, and many other concepts of space." I acknowledge that there exists extensive literature, particularly in human geography, that uses the word space to denote phenomena that I prefer to call places.

In this thesis, when I use the term space without a case-specific clarification, I imply absolute, homogenous, objectivist space defined

by Euclidean geometry. "This absolute 'empirico-physical' conception suggested that space can be conceived as outside of human experience; rather than playing an active role in shaping social life, it is regarded as a backdrop against which human behaviour is played out [...]" (Hubbard, et al., eds, 2004, p. 4).

technology

My understanding of technology is inclusive of such phenomena as speech or writing together with more obvious candidates of machines and computers. This parachronistic inclusion of pre-modern practices suggests an understanding of technology as a shared, wilful and enacted way of knowing-how or as what Ingold (2000, p. 294) called "skilled practice". Among Mitcham's (1994, p. 15) interpretations of "technology as object, as process, as knowledge and as volition [...]" (distinctions originally introduced in Mitcham, 1978), my understanding prioritises the three latter interpretations, a bias that I see as particularly fitting to the contemporary conditions where fabricated items increasingly less resemble material objects.

For an example of a non-machine technology, see te Hessen (2005) for the discussion of a notebook as a "paper technology" that enables and formats a fundamental intellectual act of "taking notice". On writing as technology, see Bolter (2001).

translation

Translation is the process of converting images, notions, concerns and languages from one field of action into another. Translation involves interpreting what the other actants including non-humans do, want or say. Knowing, ideas or technology do not propagate from actant to actant in a smooth uninterrupted flow. Rather, every step of this propagation is a performance. These performances constrain, deform or block communications.

Cf. Callon (1980, 1986), Latour (1986), Star (1989) or Law (1991).

INTRODUCTION

> The efficacy of the ritual is therefore not the manifestation of a Goddess who might inspire the answer but that of a presence that transforms each protagonist's relations with his or her own knowledge, hopes, fears and memories, and allows the whole to generate what each one would have been unable to produce separately. (Stengers, 2005, p. 1002)

> [A]ny serious "rethinking" of architecture at the start of this century cannot be undertaken without upsetting the structure and emphases of the traditional profession, of traditional typologies, and of traditional modes of envisaging the architectural subject [...]. (Vidler, 2000, p. 3)

I.1 NEW CHALLENGES FOR ARCHITECTURAL DESIGN

Places enable human life and as such are fundamental to it. For Relph (1976, p. 43), places are "profound centers of human experience." Similarly, Malpas (1999, p. 13) states that "[t]here is a good reason to suppose that the human relationship to place is a fundamental structure in what makes possible the sort of life that is characteristically human [...]". Casey (1993, p. xiii) also agrees that "[d]espite the costly character of an accelerated life, it remains the case that where we are—the place we occupy, however briefly—has everything to do with what and who we are (and finally, that we are)." As Sack (1997, p. 1) insists,

> [w]e humans are geographical beings transforming the earth and making it into a home, and that transformed world affects who we are. Our geographical nature shapes our world and our selves. Being geographical is inescapable—we do not have to be conscious of it. Yet, realizing that we are geographical increases the effectiveness of our actions, the clarity of our awareness, and the inclusiveness and generosity of our moral concerns. It helps us see more clearly our world and our place in it.

I believe that the discussion of place is important because place-construction is the ultimate goal of architectural practice. Other recognised goals such as the design of buildings are subservient to this encompassing challenge.

A reconsideration of place as a theoretical and yet practice-enabling concept is particularly important now when contemporary architecture strives to respond to numerous new challenges and opportunities. Relevant changes in the architectural palette, provoked and enabled by the development of technology, include reduced or eliminated need for drawings, the capacity for mass customisation and rapid prototyping, growing integration of real and virtual through augmented reality, ubiquitous computing, wearables and computer vision. Rapid changes in composition and understanding of contemporary societies also concern architecture. Increasingly, societies become more accepting of diverse world-views and life practices. Many institutions within contemporary societies discard or relax their hierarchies. For example, markets, cities and most of places are heterarchical. Greater flexibility in the organisation of societies provides individuals and groups with wider choices but also puts them under greater pressure to make independent decisions. Social life increasingly relies on technology and its understanding shifted from the monistic stance of technical rationality to a variety of simultaneously acknowledged perspectives. Globalization undermines many geographical and cultural boundaries bringing together previously disconnected constituencies and evoking new challenges. Environmental concerns powerfully reshape theoretical discourse and practice. The realisation that humans have overcrowded a planet with finite resources undermines traditional value systems that motivate and justify architectural design work. Greater openness in multiple aspects of place-making and

the broader reach of contemporary places leads to a dramatic increase in the complexity of design challenges.

Under the influence of these changes, the character of design has already changed dramatically. Increasingly, design is about leadership, team-building and campaigning rather than about artefact-making, individual inspiration and style. For example, the organisers of the NextD initiative (VanPatter and Pastor, 2007) believe that "the traditional model of design leadership needs to be radically reinvented to better adapt to a radically changed marketplace."

Is the discipline of architecture ready for the new challenges? Do architects have a continuing role in the making of contemporary places or are they but an atavism, sandwiched between medieval master-builders and industrial-design teams? When contemporary societies increasingly produce places sustained by digital technologies, the architectural profession has to recognise that such places fall within its remit and update its creative practice to suit the new challenges. The nature of this new remit is yet unclear as new opportunities and challenges emerge daily. For example, Flachbart and Weibel (Flachbart and Weibel, 2005, p. 8) imagine that architecture can turn into "heterarchitecture"—"a hybrid mixed-reality environment [...]" or "multiuniverses" (Weibel, 2006, p. 406–412) that mix electronic, physical and social; visible and invisible; present and absent. Similarly, McCullough (2004), Mitchell (2003) or Fox (2006) highlight the increasingly processual character of architecture, the opportunities given by emerging technologies and the ensuing need for changes within architectural practice.

The opportunities and challenges given by the development of technology has provoked a growing interest in design outcomes as continuous performances rather than as artefacts. This perspective allows turning attention always from objects towards processes and relationships that give them meaning. Examples of this interest include "experience economy" (Pine, II and Gilmore, 1999), "technology as experience" (McCarthy and Wright, 2004), "cradle to cradle" approach (McDonough and Braungart, 2002), interest in building post-occupancy (Brand, 1995), "soft architecture" (Haque, 2004, 2005), "ephemeral

architecture" (Colli and Perrone, 2003), "experience design" (Shedroff, 2001) and "funology" (Blythe, et al., eds, 2003).

In addition to the emergence of new types of places, their participants, including inhabitants and architects, also seem to lose their appearance as well-bounded objects and emerge as technology-dependant, distributed and performed assemblies. Telling examples here include an understanding of people as cyborgs participating in the digital, networked places (Mitchell, 1995, 1999, 2003), interest in the erosion of the animal/machine divide as a source of inspiration for a critical feminism (Haraway, 1991), discussions on "posthuman" condition (Hayles, 1999; Pepperell, 2003), accounts of such familiar technologies as mobile phones or search engines as extensions of mind (Clark, 2003) or visions of genetics, nanotechnology and robotics merging together in new hybrids (Kurzweil, 1999; 2005).

If architects will fail to understand and integrate into design efforts performative characteristics of places and their participants, their involvement in place-making will dwindle. In 2001, The American Institute of Architects reported (Green, 2001, p. 50) that "[n]o issue in architecture is more widely or hotly debated than the threat of a diminishing role for architects in shaping the built environment and the diminishing rewards offered for that role." Similarly, Symes et al. (1995, pp. 15, 16) report that

> [t]he general argument presented by the literature reviewed is that architects were unprepared, either individually or as a group, for the effects of rapid change in the level of demand for building services, that they were not sufficiently skilled in the identification of newly emerging market requirements and the adoption of new technologies, and that they found it hard to cope with the new fluidity in cultural expectations. Some authors even go so far as to suggest that architects have consistently and over a long period failed to absorb new technical knowledge into their modus operandi. In their view it is this failure which has led to the rise of one new professional specialization in surveying or engineering after another.

The role of architecture in place-making diminishes as the demand for the industrialisation of building production increases. Developers and engineers undertake building design instead of architects. This situation can be problematic because their professional practice, chiefly motivated by the discourses of profit and efficiency, lacks ar-

chitects' explicit commitment to the construction of social and cultural values.

Utilisation of digital technologies constitutes another important influence that is currently reshaping architectural practice. Recently, an increasing number of architects have began to engage with the new situations afforded by computing in their creative practice, overcoming the traditionally sceptical attitude of the profession to computer-aided design. Appropriation, re-contextualization and redevelopment of computing for the needs and challenges of architectural design is a huge and essential task in the world that has moved on past "the digital revolution" (Mitchell, 2005, p. 18–23; Negroponte, 1998). Even greater changes are necessary in the construction industry. Woudhuysen and Abley (2004, p. 1) state that "[c]onstruction is backward. It is atomised in industrial structure, poorly managed in practice, and endlessly weighed down by regulations." (also, cf. Frazer, 2006, p. 210) In particular, Woudhuysen and Abley insist (p. 237) that "current use of computer-aided design in two dimensions—2D CAD—as the primary medium for collaboration between consultants and trade contractors is woefully inadequate."

Further theoretical work and the development of novel working practices will allow architects to deal with games, persistent online worlds or distributed environments sustained by communication or ubiquitous technologies. In the subsequent chapters, I argue that all of these environments can and do emerge as new types of hybrid places in which the impact of computing dramatically rearranges customary relationships between inhabitants. Buildings do not define many contemporary places and often do not even participate in them directly. All places are hybrid and unstable but contemporary places are more ephemeral and dynamic than ever. Yet, these hybrid and ephemeral environments often succeed in sustaining heterogeneous ecologies as vibrant or meaningful to their participants as those found in traditional places. If technology-saturated environments are places, architectural practice ought to take responsibility for their making and wellbeing.

Discussion of places enabled or modified by digital technologies is

also important because, apart from many benefits, such technologies create many new dangers including, for example, new means of surveillance and control, previously unknown and difficult to study environmental challenges, broadening of the gap between rich and poor and concentration of power in the hands of corporations. Together with other designers and engineers, architects are responsible for reasonable and conscientious utilisation of technology. Such utilisation can only become possible as an outcome of broadly inclusive practices supported by critical reflection. Learning about far-reaching interdisciplinary relationships of architectural practice is increasingly important in the world where responsible design-practices ought to output artefacts not as singularities but as living product-systems for highly complex, living ecologies (cf. McDonough and Braungart, 2002).

I believe that through collaboration with the other disciplines in developing an adequate knowledge-base, and by expressing the new knowing as practical, creative strategies, the architectural profession can offer uniquely-useful contributions to these new places by adapting and applying its distinctive sensibilities informed by centuries of culturally-significant practice. With this thesis, I hope to contribute to the efforts of the architectural profession in refashioning its theory and practice as necessary in the contemporary conditions.

I.2 EXISTING DISCOURSE AND KNOWLEDGE GAPS

In order to tackle new place-making challenges facing contemporary architecture, I propose a three-part process that first looks at the available research methodologies potentially suitable for the study, then proceeds to consider the nature and making of places and concludes with a consideration of potentially suitable creative strategies. This section looks at the existing discourse supportive or informative to my topics and approaches. It also identifies the existing knowledge gaps and the associated needs for further research.

I.2.1 Research methodologies

As Denzin and Lincoln (1994, p. 1–17) report in their overview, the

wide range of literature on research methodologies reflects significant shifts in understanding of research that occurred since the beginning of the twentieth century. Early qualitative research adhered to objectivism, complied with imperialism, believed in the monumental quality of ethnography and implicitly presumed that the cultures it studied were timeless. The consequent, modernist, stage continued with this legacy, attempting to formalise qualitative methods and presenting them as science. From the 1980s, multiple genres of open-ended research began to replace the functional, positivist, behavioural and totalising methodologies (Geertz, 1973, 1983). As Geertz (1983, p. 19) reports, "many social scientists have turned away from a laws and instances ideal of explanation toward a cases and interpretations one, looking less for the sort of thing that connects planets and pendulums and more for the sort that connects chrysanthemums and swords."

Now, the primacy of positivist approaches belongs to the past and the academia utilises a wide spectrum of research methods including: 1) a positivist/postpositivist approach that presumes the existence of one reality, knowable within the probability margins, and accepts objectivity as primary and the researcher as a dispassionate observer; 2) an interpretative/constructive approach that presumes multiple, socially constructed realities and inescapable interaction between researchers and the world; and 3) emancipatory approach arguing that social, political, cultural, economic, ethnic, gender and disability values shape multiple realities, that researchers interact with the world and that no knowing exists outside of society and history. The co-existence of variously classified spectrum of approaches is evident in a range of available taxonomies of research methodologies such as those of Creswell (2003), Groat and Wang (2002), Morgan and Smircich (1980) or Robson (2002).

Among this diversity of methodologies, advocacy and participatory approaches including feminism, queer theory, racial discourse, disability inquiry and critical theory have provided established examples of research closest to my methodological stance. In the same way that I began my research in support of architectural knowing and archi-

tectural profession, these approaches begin with an acknowledged political stance and respond to an existing situation, for example the need to empower an underprivileged group of individuals (e.g., cf. the discussion and examples of activist anthropology and sociology in Creswell, 2003; Denzin and Lincoln, eds, 2005).

Another analogous attitude to knowledge production is characteristic of inductive approaches that advocate development of theory in response to practical circumstances and include such widespread methodologies as grounded theory (Glaser and Strauss, 1967). Recent constructivist interpretations of grounded theory that emphasise its interpretative potential in resistance to its objectivist's origins provide "flexible analytic guidelines that enable researchers to focus their data collection and to build inductive middle-range theories through successive levels of data analysis and conceptual development." (Charmaz, 2005, p. 507)

A combination of an activist attitude and inductive approach to knowledge-making is compatible with methodologies of participant observation. Belonging to the diverse realm of qualitative research, participant observation is an established technique in anthropology and human geography. It "is accepted almost universally as the central and defining method of research in cultural anthropology but in the twentieth century has become a common feature of qualitative research in a number of disciplines." (DeWalt and DeWalt, 2002, p. vii) Participant observation often contributes to preparatory stages of positivist, scientific approaches to data collection. However, more commonly and powerfully, "participant observation has been conceptualized as fundamentally different from the methodology of the physical sciences, as a special methodology, uniquely adapted to the distinctive character of human existence." (Jorgensen, 1989, p. 7)

Participation is an approach that is gaining recognition as a method of research in preparation for and in support of designing. For example, in his ethnographic study that "looked at the actual practice of air traffic control as it occurs and unfolds, moment by moment, day to day, and as it is executed and experienced by the air traffic controllers themselves [...]", Dourish (2001, p. 64) discussed a failure to design

an automated, digital airplane-navigation system. Designers who set up the system were not directly involved with the work of navigation. They represented relationships between people, places and objects as a system with well-defined goals, methods and tools. However, this system failed to take into account the intricacies of the situation such as unrecorded, unorthodox and tacit usages of the tools, environments and communication protocols. Based on his analysis, Dourish advocated learning through observation of existing practices and incremental design with broad participation.

Participant observation also gains recognition as a useful or even indispensable approach in architectural research (Zeisel, 1981), interactive-systems design (Crabtree, 1998, 2001; Hemmings and Crabtree, 2002), the study of new media including mailing lists, blogs, chat rooms, multi-user dungeons and virtual environments (Cherny, 1999; Kendall, 2002; Laurel, ed., 2003; Suler, 1996), games (Aarseth, 2003) and massively-multiplayer online-worlds (Terra Nova, 2006).

Less common are the methodologies that allow and encourage researchers to engage in direct action within their fields of study. Participatory-action research provides one influential example of methodologies used for learning from experience especially when dealing with community work, group dynamics and participation (e.g., see Argyris, et al., 1985; Argyris and Schön, 1974; Lewin, 1951; Wadsworth, 1998). Zuber-Skerritt (1992, p. 15) summarized emancipatory action research as

> Critical (and self-critical) collaborative enquiry by
> Reflective practitioners being
> Accountable and making the results of their enquiry public,
> Self-evaluating their practice and engaged in
> Participative problem-solving and continuing professional development.

Furthermore, Swan (2002, p. 56) argued that "action research and the action of designing are so close that it would require only a few words to be substituted for the theoretical frameworks of action research to make it applicable to design."

Indeed, the academic community has began to take steps toward the formal recognition of practice-based/practice-led research as a new branch of legitimate methodologies (e.g., see Research Assess-

ment Exercise 2001, publ. in 1999; Research Assessment Exercise 2008, publ. in 2005 and 2006). As Haseman (2006) reports,

> [r]esearchers in the arts, media and design often struggle to find serviceable methodologies within the orthodox research paradigms of quantitative and qualitative research. In response to this and over the past decade, practice-led research has emerged as a potent strategy for those researchers who wish to initiate and then pursue their research through practice.

He argues that "performative research" emerges as a new powerful paradigm in research practice that complements and equals quantitative and qualitative research. According to Haseman (p. 103), performative research expresses knowing in "forms of symbolic data other than words in discursive text. These include material forms of practice, of still and moving images, of music and sound, of live action and digital code."

This position emerged against the background of a broad debate on the value and form of theory construction, evaluation and reporting of practice-based research in design disciplines. This debate engages with validity and utility of often incompatible ontological and epistemological stances and their implications for the emergent theoretical foundation of the design disciplines. As recent examples demonstrate (e.g., see Bayazit, 2004; Biggs, 2004; Durling, 2002; Friedman, 2000, 2002; Gray and Malins, 2004; Rust, 2003, 2004; Rust and Robertson, 2003; Rust and Wilson, 2001; Rust et al., 2000; Swann, 2002), a broad-ranging discussion on these topics is still far from converging towards stabilisation as one or several dominant approaches.

Specifically to architecture, the existing anthologies of research methods and theoretical approaches demonstrate (e.g., cf. Groat and Wang, 2002; Hays, ed., 1998; Leach, ed., 1997; Ockman and Eigen, eds, 1993; Snyder, ed., 1984) that architectural theory resists unification and accommodates many idiosyncratic and disagreeing voices. As Symes et al. (1995, p. 20) observe, "architects believe passionately in the importance of good design but disagree constantly as to its definition." Similarly, Wang (2006, p. 263) states that

> [c]urrently in the realm of architecture, the definition of 'theory' has become so indeterminate that the word cannot be used with much confidence of mutual understanding between individuals. In a way this is not

> surprising because architecture encompasses so many kinds of human endeavour: the engineering disciplines emphasise scientific method; the social sciences prize thick description; and the design fields often rely on polemical utterances: 'less is more', for example, or 'less is a bore'.

Movements in architecture link to many overlapping, contradictory and temporary theories that rise in support of experimentation and decline as their creative potential dissipates (e.g., see Jencks, 1985). This multiplicity suggests the impossibility of a unified theory. For example, Harbison (1998, p. viii) confesses his "state of doubt about the very possibility of theory [...]" in architecture. Similarly, Johnson (1994, pp. xvii, 10–13, 17, 190, 204–205, 285, 341) suggests that only "theory-talk" ,rather than theory proper, is operational in architecture. I suggest that a multiplicity of opinions is an inescapable and positive situation in place-making (e.g., on the anarchic knowledge-acquisition in science, cf. Feyerabend, 1993). However, this multiplicity also causes problems because architectural practice and discourse combine theoretical pluralism with the persevering notion of creative genius expressed through charismatic, overpowering, mysterious and revolutionary personae. Authorised by this mythical inspiration, architects tend to generalized, manifesto-style theoretical pronouncements that make referencing of complex situations impossible, accrual of shared knowing impeded and the reuse of experience difficult. The notion of genius creator promotes individualist, secretive and autocratic attitudes towards architectural practice making communication with stakeholders difficult and putting in question the contributions made by the architectural profession. Lay people often value buildings architects loath while architects praise projects that other constituents find lacking. Contemporary architectural discourse as seen in professional journals also often fails to influence other place-makers operating outside of traditional professional boundaries such as those designing for films, games or online worlds.

The modernist way of thinking is responsible for many of these trends or can serve as a telling illustration. As Johnson (1994, p. xiv) explains,

> [t]here were three primary assumptions: that a building was an expression of its function; that exposing the structure or using materials in their

> brute state was an "honest" aesthetic; and that architecture and social engineering went hand in hand to better future lifestyle and reform de-generating cities. It came as both a shock and an affront when architects heard murmurings that these hallowed values were not believed, that people actually disliked much of the work in which architects had made such psychical investment. Instead of being praised for their clever manipulation of numbers and ingenious mass production, architects were severely criticized. Most damning were accusations that they were forgetting people.

Modernism and its continuing influence in architecture also tended to ignore the significance of symbolic capital and other socially-constructed public values that did not fall into its functionalist, generalist and rationalist rhetoric. Thus, Harvey (1990, p. 80) claims that

> it is fair to say that the modernist push, partly for practical, technical, and economic, but also for ideological reasons, did go out of its way to repress the significance of symbolic capital in urban life. The inconsistency of such a forced democratization and egalitarianism of taste with the social distinctions typical of what, after all, remained a class-bound capitalist society, undoubtedly created a climate of repressed demand if not repressed desire [...].

Modernism's successor in architecture, in the guise of postmodernism, also failed to relate to the complexities of local lives tending instead towards sentimental eclecticism and ornamentation that propagated social divisions and capitalist values of the privileged (Habermas, 1998; Harvey, 1990; e.g., see Jameson, 1991).

Both movements are characteristic of the primacy given to architects' values in preference to local concerns. The same tendency continues nowadays with new fashionable, idiosyncratic approaches coming to the fore and affecting the imagination of students and practitioners. On many occasions, the architectural profession has been able to provide inspirational social-leadership. However, I suggest that together with other designerly disciplines it can greatly benefit from a more inclusive, collaborative understanding of creativity as well as from the development and utilisation of more inclusive, systematic, rigorous and persuasive theories.

Preoccupied by the intrigue of their personal, proclamatory theories architects also tend to accept the proposals of "critical" design, generated in artificially-favourable settings, such as those of design

schools, "as evidence of the *superiority* of Design values over those of the Market or Community." (Hubbard, Jr., 1995, p. 163) Inclined to resist the transactions of values from other domains (ibid.) and overwhelmed by the complexities of contemporary places, architects struggle to keep up with the rates of technological and social change. Design professions increasingly encounter new, poorly understood challenges. The impacts of new technologies and related social practices on the architectural profession are controversial and unclear. Multiple, globally important kinds of places have emerged, unexpectedly for experts, through grass-root participation sustained by networked computers. Designerly engagement with such places requires open-minded, inclusionary attitudes characteristic of contemporary anthropology or ethnography. Yet, participation-based methodology and hermeneutic, interpretative presentation are still uncommon in architectural research, especially in combination with creative practice. I suggest that architecture as a profession and as a social practice can benefit from the development of methodologies that allow deeper, dynamic, continuous engagement with a broader range of actants. These research methodologies must help to unite research and practice by providing techniques for learning and dissemination suitable in the fast-changing and unpredictable technology-saturated social world. Practice-based and ethnographic methodologies have a promise to fulfil these needs but they are still new, unusual and insufficiently studied in architecture. To fill this gap, architectural research has to develop theoretical justifications, criteria for rigour and practical implementations exploring and demonstrating strengths and weaknesses of such methodologies.

In addition to the need for cross-fertilisation with other disciplines well-versed in social research, the development of methodologies suitable for the production and dissemination of knowing in design disciplines depends on the continuous effort to improve clarity and openness of fundamental assumptions. Such clarity and openness are prerequisites for the conversion of personal theories-in-practice into sharable templates for action. Current research discourse incorporates multiple fundamentally-incompatible stances relying on

necessarily-axiomatic primary knowledge-claims. Consequently, the audience needs to know how to value a particular research effort because knowledge claims—ontology and epistemology—determine the choice of methods and suggest utilisation of findings. Identical or similar methodologies can serve ontologically and epistemologically divergent goals thus inviting misinterpretation. Research projects based on disparate knowledge claims produce different and often incompatible arguments. Adequate understanding and evaluation of research are not possible if the knowledge claims are opaque as is common for architectural manifesto-theories. As Morgan and Smircich (1980, p. 499) insist,

> [a] preoccupation with methods on their own account obscures the link between the assumptions that the researcher holds and the overall research effort, giving the illusion that it is the methods themselves, rather than the orientations of the human researcher, that generate particular forms of knowledge. [S]ocial science disciplines [...] would be better served if researchers were more explicit about the nature of the beliefs they bring to their subject of study. Much of the debate and criticism over methodology involves researchers who are failing to communicate with one another because they hold varying basic assumptions about their subject.

Traditionally, academia did not acknowledge architecture, art and design as legitimate research pursuits and many in the academic community remain suspicious towards validity of their research output. In these conditions, researchers in design disciplines must be particularly clear and open about their knowledge claims.

The closed character of architectural designing, often accessible only to experts and clients, exacerbate the situation already characterised by the lack of clarity and openness about fundamental assumptions. This is an area where integration of research methodologies in support of or towards modification of current design-practices can introduce much-wanted appreciation of techniques for participatory data-collection, consultation, collaborative action, ethical engagement with constituencies and other socially-aware approaches existing or under development in the broader field of social, transformation-oriented studies such as emancipatory-action research. Accessible designing supported by documented reflection and feedback

can improve understanding, communication and future utilisation of case-studies. Further work in this area is necessary because sharing and utilisation of practical knowing in contemporary design are inadequate. As Swan (2002) observes,

> [t]oo often, designers scorn writing about their practice in anything other than journalistic and celebratory terms. Writing and documenting design success stories is left to the magazines, who take a fairly superficial, glossy view of design practice. Case studies that have been a staple diet in the business world are almost nonexistent in design [...].

In addition to the lack of a systematic and reflective attitude towards designing, the difficulty in communicating complex, embodied, and distributed experiential knowing prevalent in designing hampers the sharing of architectural knowing and impedes the transfer of research outcomes into professional practice. Exchange of knowing through precedents, essential in design disciplines, is yet underdeveloped, particularly in architecture (Heylighen, et al., 2005). Better utilisation of case-studies in a reflective and critical manner is necessary for the development of design approaches capable of an open, collaborative, iterative development of places.

I.2.2 Performative place

My study of the academic and professional discourse has demonstrated a growing interest in the concept of place. Architects draw their understanding of places from philosophy, geography, anthropology and sociology. These disciplines generated a broad body of scholarship even though the concept of place only recently re-entered academic discourse after a prolonged absence. This literature often takes a historical perspective describing the progression of ideas on place (e.g., see Casey, 1993, 1999; Pólya, 2004). Re-emergence of place as an actively debated concept in discourse began in the 1960s with the appearance of literature on environmental psychology (e.g., see Bechtel and Churchman, 2002) and proxemics (e.g., see Stokols and Altman, eds, 1987). During the 1970s authors such as Bachelard (1994), Relph (1976), and Tuan (1974, 1980) undertook an ontological exploration of place. They claimed that people lived in a world of real places and rejected the ontological priority of absolute space. They sought to dem-

onstrate that the concepts such as absolute space or region were human constructions rather than natural phenomena. Phenomenology is the common background for these and other works (e.g., see Bachelard, 1994; Casey, 1993, 1999; Downing, 2000; Heidegger, 1971; Holl, et al., 2006; Malpas, 1999; Merleau-Ponty, 1962; Norberg-Schulz, 1966, 1971, 1975, 1980, 1985, 1988; Pallasmaa, 1996; Seamon, 2000b; Vesely, 2004; de Certeau, 1984) and its influence is one of the most dominant in the discourse on place in architecture, philosophy and geography.

Current discourse accommodates multiple concepts of place and space with overlapping and contradictory meanings and definitions. Curry (2002) insisted that co-existence of multiple conflicting interpretations is an inevitable outcome of a contradictory history that surrounds the development of concepts of space and place. He argues (p. 511) that

> the words 'space' and 'place' are seminally ambiguous, just because each has from early in its history been capable of being used within the three different discourses of the topographic, the chorographic and the geographic. [T]his ambiguity has been supported by the development and use of a series of technologies, of writing, surveying and mapping, and then of transportation and communication, just because it seems possible to build a mutually comprehensible discourse about space and place around each technology.

The current academic discourse spans from literature based on the relational understanding of place to the work based on the idea of absolute continuous space. Philosophical and historical perspectives (e.g., see Casey, 1993, 1999; Entrikin, 1991; Seamon, 2000a, 2000b) are typical for the former approach while the latter underlies such disciplines as cartography, geographic-information-system and global-positioning-system studies. A large variety of literature exists between these extremes.

The understanding of places as relational, constricted and performed also has parallels in cognitive science and psychology, particularly in the influential concept of "mental images". The extensive literature on the subject discusses this concept in various guises and under different names such as "mental images" (Pinker and Kosslyn, 1978), "mental maps" (Downs, 1977; Downs and Stea, eds, 1973; Gould

and White, 1986), "mental models" (Johnson-Laird, 1983), "cognitive maps" (Kitchin, 1994; Kitchin and Freundschuh, eds, 2000) and "mental collages" (Tversky, 1993, 2001).

In the design of three-dimensional, navigable, virtual environments, Lynch, particularly, has become one of the most quoted authors who applied the idea of a mental image to the architectural and urban problematique. Examples of direct adoption of Lynch's concepts in the role of design templates include Dalton (2002), Darken and Sibert (1993), Charitos (1998), Elvins et al. (1997), Strohecker et al. (1998), Vinson (1999) and many others. Literature on navigation and wayfinding in virtual environments is particularly rich in such examples. My own designs also referred to Lynch's concepts in the past.

I recognise the usefulness of Lynch's (Lynch, 1960) framework consisting of "paths", "edges", "districts", "nodes" and "landmarks" and popularised by his study of legibility entitled The Image of the City, as a useful generator of provocative design moves but not as an all-purpose instrument of theoretical justification. This framework is attractive in its simplicity and clarity. However, it also suffers from imposed rationalisation that cannot take account for the great variety of places or personal experiences of them. In Lynch's own words (Lynch, 2007, p. 110),

> this study, whose principal aim was to urge on designers the necessity of consulting those who live in a place, had at first a diametrically opposite result. It seemed to many planners that here was a new technique—complete with the magical classifications of node, landmark, district, edge, and path—that allowed a designer to predict the public image of any existing city or new proposal. For a time, plans were fashionably decked out with nodes and all the rest. There was no attempt to reach out to actual inhabitants, because that effort would waste time and might be upsetting. As before, professionals were imposing their own views and values on those they served. The new jargon was appropriated to that old end, and its moral was stood on its head. Instead of opening a channel by which citizens might influence design, the new words became another means of distancing them from it.

While Lynch's further research aimed to remedy the limitations of his original study (ibid.), The Image of the City, his by far most influential book in the design fields, dealt with a particular choice of loca-

tions situated in given historical moments, engaged with an unrepresentative selection of respondents and described averaged images of the city produced with a deliberate exclusion of meanings apart from those relevant to wayfinding. The study did not take into account that individuals might see the city in incompatible ways and that individuals construct or adjust their mental images in response to different circumstances or needs. Therefore, usage of his framework as a general theory or as a prescriptive design-guide can lead to solutions that do not reflect local specificity. Yet, the uncritical usage described in the above citation continues in the multidisciplinary fields concerned with the design of contemporary, technology-saturated places.

I recognise that many researchers working in cognitive science have offered understandings supportive of my approach. According to these understandings, mental images emerge in a bi-directional process: existing images shape the nature of newly constructed images and those, in turn, update the already established ones. Environments known to people are the products and not the causes of perception. People build them via transactions that are unique for each individual. Consequently, individuals have different mental images of the same physical environment. Mental images are never complete, accurate, survey-knowledge-like representations. They always have inbuilt distortions and omissions. They are more like patchworks than coherent maps. Nor do they have to exist in the mind as maps or images. Different people rely on different features in order to acquire landmarks for navigation. Distinct shape, function, smell, unique events, sentimental memories, or repetitive encounters all come into play when a situated feature acquires prominence in a traveller's mind. Mental images have immediate, always-accessible, in-action quality. They are not just memories. Instead, people always imagine and reconstruct mental images (e.g., cf. Ippolito and Tweney, 1995). However, they often deal with minds often considered in isolation from the practical circumstances of situation and without accounting for cultural and personal circumstances of individuals. Because in my research I sought to emphasise multiplicious and subjective forms of places emerging in particular local circumstances, in the argumenta-

tion developed for this thesis I have refrained from any explicit adoption of traditional cognitive approaches.

Among the researchers working with digital technologies, many have argued that the concept of place is particularly suitable for understanding environmental interaction and designing of situated technologies. This work also led to an ongoing reconsideration of traditional cognition and psychology. For example, Erickson (1993) discussed "spatial metaphors" in multi-user dungeons seeking to improve human-computer interface design. Dourish and colleagues campaigned for place-related design of computer systems for Computer-Supported Cooperative Work (Dourish, 2001, 2004; Dourish and Chalmers, 1994; Harrison and Dourish, 1996; Moran and Dourish, 2001). Dourish was also instrumental in the initiation of the "social navigation" (Höök, et al., eds, 2003; Munro, et al., eds, 1999) design philosophy that, apart from his "social computing" relies on emerging theoretical frameworks such as distributed (Hollan, et al., 2000), and experiential (Lakoff and Johnson, 1999) cognition. Other related approaches include Nardi's work on "information ecologies" (Nardi, 1996; Nardi and O'Day, 1999), Lave's work (Lave and Wenger, 1991) on situated learning, Suchman's studies of situated actions for human-computer interaction (Suchman, 1987) and the work of Agre (1997), Clancey (1997), Clark (1997), Chapman (1991), Hendriks-Jansen (1996) and Hutchins (1995) who emphasise the distributed nature of representation and the situated, local character of knowing. Their efforts in relationship to technology are parallel to those in "learning sciences" who believe in the importance of context and develop "design-based" research approaches (e.g., see Barab and Squire, 2004; Brown, 1992). Researchers with technical backgrounds and more recently with digital-art affiliations also discuss many place-related themes such as Ubiquitous Computing, Augmented Reality, Tangible Interfaces, Wearable Computers, Intelligent Buildings, Intelligent Spaces under the umbrella term "context-aware computing" (e.g., see Moran and Dourish, 2001). In virtual environments, Oliver discussed place in relationship to massively-multiplayer online-games and videogames in general (Oliver, 2001, 2002). Champion considered the concepts

of place and "cultural presence" in relationship to virtual heritage environments (Champion, 2006; Champion and Dave, 2002). Kalay (2004), from his standpoint as a computer-aided-design practitioner and theoretician, suggested that designers should build virtual environments as places, following his guidelines of "placeness".

Another approach to "situatedness" (Gero and Kannengiesser, 2004, p. 376) in relationship to designing emerges from the work of Gero and his colleagues (e.g., see Gero, 1990; Gero and Kannengiesser, 2004; Saunders and Gero, 2002; Sosa and Gero, 2003, 2005). Two papers representative of Gero's work appeared in 1990 and 2004. In the latter paper, Gero suggests that "situatedness and [another fundamental concept] constructive memory [...] provide the conceptual bases for grounding the knowledge of an agent [such as a designer] in the situation being constructed by its interactions with the environment." (Gero and Kannengiesser, 2004, pp. 376, 377)

The main difference between my approach and Gero's is in our differing understandings of designing. Gero's understanding is functionalist and agent-based. In his 1990 paper, Gero first introduced the function-behaviour structure framework, which views designing as a well-defined and non-problematic activity. For example, the paper claims that "[a] designer begins with required functions from a client [...]" (p. 33) without considering that many types of designing begin in other ways. The paper also claims that "the result of the activity of designing is a design description [... and that] [t]he purpose of such a description is to transfer sufficient information about the designed artefact so that it can be manufactured, fabricated or constructed." (p. 28) In my view, this focus on artefactual outcomes impedes the recognition of designing as a social engagement. Consequently, the focus on artefacts also makes it more difficult to account for beneficial or harmful outcomes of designing because many of these outcomes are social or socially contingent. Gero's paper does not question identities of designers or other stakeholders and does not consider who orders, evaluates and uses designed artefacts. The target audience of this paper and the intended scope of its application are also unclear. This lack of explicit targeting creates an appearance of an attempt at a general,

universally applicable description of the design process. However, in this paper, Gero refers only to the more conventional situations of professional practice as is suggested by the paper's only example—a consideration of window designing. As an enabler of a far-reaching theoretical discussion of the design process, this example is problematic because Gero considers an established, unproblematic type of object. The paper discusses this example as an abstract, generic problem existing separately from a particular situation. While the conclusions of this analysis seem far-reaching, its internal logic remains inapplicable to the complexities and controversies of many practical design situations.

Gero and Kannengiesser's 2004 follow-up paper attempts to remedy the deficiencies of the function-behaviour-structure framework by accounting "for the dynamic character of the context in which designing takes place [...]" (p. 373). The paper suggests that "interaction between the designer and the environment strongly determines the course of designing." (p. 376) and states that this idea is inherited from the works of Bartlett (1995), Dewey (1896) and Clancey (1997).

Notwithstanding this attempt to extend the framework originally suggested by Gero, in continuing to only invoke the window example, Gero and Kannengiesser's 2004 extended framework inherits the limitations characteristic of Gero's 1990 paper. Their extended framework still cannot tackle complex and controversial social circumstances of designing, can only be applied to a limited range of design situations, especially those fitting into established professional confines, and has limited capacity to describe free-search cross-domain processes that lead to innovation in contemporary organisations. Gero and Kannengiesser (2004) make their audience more explicit by suggesting that their framework can serve as the "foundation for the development of intelligent agent-based design systems" (p. 390) This interest in artificial intelligence, artificial creativity (Saunders and Gero, 2002) and computational models of creative design (e.g., cf. Gero and Maher, eds, 1998) encourages formulaic clarity that, in their framework, reduces the richness and diversity of practical design-situations to generic, abstracted patterns.

While I agree with the general rhetoric of Gero and Kannengiesser's (2004) paper, my understanding of concepts equivalent to situatedness and constructed memory extends beyond the formulations suggested in Gero and Kannengiesser's "situated FBS [function-behaviour-structure] framework" (p. 373). In particular, I emphasise that all human situations are constructed and that multiple participants engage in these constructions. This understanding emphasises interrelationships where Gero and Kannengiesser emphasise separations such as in their conceptual division of design situations into three worlds: external, internal and expected (p. 377, 378). Extending their emphasis on dynamism and the constructed character of designers' internal worlds, my view highlights that such phenomena as mind, consciousness, cognition and memory are also directly reliant on the presence and performances of other human and non-human participants. In addition to being dynamic and constructed such phenomena are also distributed.

In a complementary effort to Gero's work, my approach emphasises the complexity of concrete situations seeking to draw insights from close engagement with case-study examples. Instead of orienting research towards formulations of computational models of designing, I am seeking to uncover the hybrid, shared characteristics of design processes that involve heterogeneous participants and are irreducible to formulae.

My understanding of places as performed rhizomes of relationships benefited from the extensive discourse arising from actor-network theory with its "sociology of associations" (Latour, 2005, p. 9), relational view of technical objects and approaches theorising action as situated (e.g., see Callon, 1986; Latour, 1987, 1999; Law, 1992). While actor-network theory does not specifically focus on places or the architectural problematic, its interpretations of science and technology help to explicate the new, intensely-technological contemporary places. Structuration theory in sociology (Giddens, 1984) is another related approach that sees action as situated and dependent not only on the physical world but also on the accumulated action of other actants. Johnston (2001) proposed a meta-theoretical unification of situ-

ated action approaches, actor-network theory and structuration theory for the purposes of information technology and found that their combined influence and scholarship can also contribute to the discussion on place in the architectural context.

An understanding of places as social constructions presupposes the existence of a process that leads to their emergence. Interest in places as processes is evident in the writings of several geographers. For example, Lynch (1976) wrote on the temporal patterns in places. Pred (1984) commented on constant change in places. Massey (1994a), Thrift (1996), de Certeau (1984) and Soja (1989) discussed the role of events and practices in continuous formation of places and Castells (1991) considered contemporary urban environments integrated with digital technologies as a "spaces of flows" rather than as "spaces of places". Related work of Lefebvre (2001), Harvey (1993, 1996), Smith (1984) and Brenner (1998) considered places as dynamic outcomes of social production rather than static or given phenomena.

In addition to theory, artistic performance-practices also provide provocative examples that help to widen understanding of places by highlighting their constructed character and challenging existing social norms. Examples include the pioneering works of Dada artists such as Marcel Duchamp, process-based practices of John Cage, provocations by Fluxus (Friedman, et al., 2002) and reflective practices of Alan Kaprow (1993).

Over the years, Kaprow's work conjured many ideas exposing place and architecture as performative engagements. His "happenings" accepted the value of randomness, the ephemerally and non-repeatable nature of performances, stressed the relation of performative with the everyday and developed tactics for estranging and imaginatively reconstructing the existing environment of the city and the landscape. Kaprow (1993, p. 98), writing on the "fluid identity" of art, provided a vision that provides an inspirational example for architecture and place-making revealing portmanteau meanings and subjective framings. For example, writing on the boundaries between the artistic and the everyday, he observed that

> [n]onart is whatever has not yet been accepted as art but has caught an art-

> ist's attention with that possibility in mind. For those concerned, nonart [...] exists only fleetingly, like some subatomic particle, or perhaps only as a postulate. Indeed, the moment any such example is offered publicly, it automatically becomes a type of art. Let's say I am impressed by the mechanical clothes conveyors commonly used in dry-cleaning shops. Flash! While they continue to perform their normal work of roller-coastering me my suit in twenty seconds flat, they double as Kinetic Environments, simply because I had the thought and have written it here.

The work of Fluxus also demonstrates that place-making gestures can have critical, provocative and non-material character. For example, Fluxus Piece for G.M. by Albert M. Fine (date unknown) documented by Friedman (2002, p. 34) reads as follows:

> 2 events are advertised at 2 adjacent locations. Audience is brought into the same hall by separate entrances. The audiences are separated from each other by a curtain. For the performance, the curtain is raised.

In this example, an unconventionally staged encounter altered perceived affordances and enacted engagements of a place revealing the extended meaning-structures, unobvious but necessary for situated, shared participation.

Some architects and urban designers have also commented on the contingent, performed character of places. For example, Fleming (1987) described how "public art" objects characterise their host places. In one of his examples, diagrams of dance steps embedded into the pavement provoked people to dance, their visual, physical engagement attracted spectators and the resulting gathering drew in further passers-by. The effect of the installation unrolled as a chain reaction of participation and shared amusement. Whyte (1988) collected similar observations on the spontaneous and informal social life in the cities where objects acted as catalysts for emergent social-behaviour.

In an effort to establish an understanding of "critical architecture", Hill (2006, p. 51–54) introduced concepts of "immaterial architecture" and "immaterial practice" sustained in multiple sites such as drawings, texts and buildings by multiple agents, including architects, users, buildings and weather, all acting as authors.

In theatre, the work or influence of Antonin Artaud, Jerzy Grotowski, The Living Theatre (Julian Beck and Judith Malina), Richard Schechn-

er, Peter Brook and others produced suggestive creative experiments that explored audience participation and the relationship of place with performance (e.g., see Innes, 1993; Schechner, 1994, 2003). For example, The Performance Group's (Schechner, 2003, pp. 59–61) 1969 production of *Makbeth*[1] featured complex audience movement that resulted in subjective viewing. Three or four scenes played simultaneously with no single place from which a spectator could see everything. The audiences were cooperative and their silent and discreet but active participation supplied *Makbeth* with its soldiers, crowds, guests and witnesses. In seeking social alteration, avant-garde artists turned attention to traditional cultures and attempted to repurpose the rituals such as rites of passage for this purpose. As Innes (1993, p. 11) explains, "[t]he essence of a rite of passage [...] is that it requires physical and emotional involvement in a present action, and seeks to change the nature of the participants directly by irrational, often highly disturbing means [...]".

While the work in art and theatre provides subjective, in-practice theories and inspirational practical experimentation, a number of researchers in academia also discuss processes of social construction in terms of performance. For example, Goffman (1969, 1974) and Turner (1966, 1982, 1988; 1986) discuss ritual, everyday and theatrical performances as foundational to interpersonal interactions. In an even more far-reaching stance, McKenzie (2001, p. 18), capitalising on the discourse that includes Marcuse (1955), Lyotard (1984) and Butler (1990), forecasts that "performance will be to the twentieth and twenty-first centuries what discipline was to the eighteenth and nineteenth, that is, an onto-historical formation of power and knowledge." Further (ibid.), emphasising the constructed character of socio-technical entities, he insists that

> [h]yphenated identities, transgendered bodies, digital avatars, the Human Genome Project—these suggest that the performative subject is constructed as fragmented rather than unified, decentered rather than centered, virtual as well as actual. Similarly, performative objects are unstable rather than fixed, simulated rather than real. They do not occupy a single, "proper" place in knowledge; there is no such thing as the thing-in-itself.

1. Distinguished in spelling from Shakespeare's *Macbeth*.

> Instead, objects are produced and maintained through a variety of socio-technical systems, overcoded by many discourses, and situated in numerous sites of practice.

Despite the growing body of discourse that understands places as relational and dynamic, Massey's (1994b, p. 167) observation that "[t]he most common formulations of the concept of geographical place in current debate associate it with stasis and nostalgia, and with an enclosed security [...]" is particularly true for architecture. Meanwhile, complex and controversial realities of habitation, economic and practical constraints as well as pressing ecological concerns undermine the usefulness of monumental architecture built to outlive its makers and users. I suggest that architecture needs to acknowledge the value of the ephemeral and temporary. Instead of seeking to erect symbols of power, architecture needs to to account for and help to produce hybrid, transitory and multiplicious places brought about by technological development and globalisation.

The mainstream architectural-discourse must learn to problematise the concept of place. Common interpretations, inspired by a romantic reading of phenomenology, are out of line with contemporary thinking in anthropology, ethnography, sociology or geography. Recent discourse in these disciplines has exposed traditional, romantic and essentialist notions of place as simplistic, utopian, exclusionary and unfair. Architectural research lacks systematic accounts of places and projects considered as relationships and processes rather than objects and spaces. If architecture is to retain its position as a key player in the design and construction of places, it has to update its knowing and practice to take into account recent technological developments and emerging social practices. As McCullough (2006, p. 18) stated,

> we can, and must, temper universal information technology design with more helpful attitudes about place. The contextual design of information technologies must now reach beyond the scale of individual tasks to embrace architecture, urbanism, and cultural geography. No methodology exists for this difficult role, but this has already become a problem that is costly to ignore."

This update is urgent as, under the influence of technological development, new types of places emerge every day and the meaning of

familiar places shifts. As Mitchell (2003, p. 162) observed, "[f]or architects, continuous fields of presence and the destabilization of person-to-place relationships demand some radical rethinking of the fundamentals." To remain relevant, architecture needs to extend its remit and admit a wider scope of participants into the design process. In design, the recognition of this need is expanding. For example, NextD initiative (VanPatter and Pastor, 2007) emerged to campaign for redefinition of design as a transdisciplinary practice. Similarly, Krippendorff (2006) argues for a wider recognition of stakeholder networks in designing. In architecture, however, the awareness of the new demands and the development of adequate practices are still lacking. The offer for participation has to extend to all people but also to other entities including animals, objects, ideas and even Gods because any of these entities can be crucially significant in the minds and actions of important stakeholders. Existing understandings of place in architecture underestimate or do not acknowledge many crucially important participants, relationships and performances.

While there exists recent literature that discusses the concepts of space and place in terms of distributed assemblies, flows and fluid boundaries, this literature usually takes a broad view considering places in general terms. Because most of this literature originates in human geography or sociology, it also prioritises social and political characteristics without directly linking them to architecture. Architectural discourse is not sufficiently aware of this literature and, subsequently, fails to utilise it for theory-making or in-practice reflection.

The utilisation of the research discourse produced by a broad spectrum of social studies in architectural research is difficult because the relevant literature does not use architectural case-studies or investigative-designing methodologies. Consequently, the common examples and case-studies are different from those experienced by architects. Where case-studies are similar, often the perspectives of practicing designers are considerably different from that of social scientists or geographers. This difference in perspective often makes research examples in social-studies literature less inspirational for utilisation in

designing than the theories themselves intend or warrant. This situation invites a reconsideration of the concept of place in architecture as suggested by social studies but through immersive, action-based methodologies able to generate insights emerging from and relevant to design practice.

I.2.3 Creative design-computing

Creativity becomes increasingly important in contemporary societies. Florida (2002, p. 5) argues that creativity "is now the decisive source of competitive advantage." Many other authors in various fields and particularly in business, management and organisational studies also recognise the crucial role of creativity in contemporary culture and economy. For example, Choi and Thompson (2005, p. 87) acknowledge an immense interest in creativity and innovation among the business community estimating that "since 1996, over 250 books on creativity and innovation have been released." In their report to the National Research Council of the United States, Mitchell at al. (2003, p. 1) argue that "information technology [...] is forming a powerful alliance with creative practices in the arts and design to establish the exciting new domain of information technology and creative practices [...]. There are major benefits to be gained from encouraging, supporting, and strategically investing in this domain." I believe that case-based discussion of technically assisted creative processes can help in the understanding and designing of computer-assisted workflows in support of creativity in architecture.

With the recent advances in computer technologies, architectural professionals have become increasingly interested in Building Information Model, Product Lifecycle Management and similar initiatives aimed at improving efficiency of design processes, linking of design with fabrication and construction, assisting with the maintenance of buildings and reusing of their components (e.g., cf. Kieran and Timberlake, 2004; Kolarevic, 2003; Kolarevic and Malkawi, eds, 2005). This trend in many ways continues the early efforts of computer-aided design and architectural artificial-intelligence communities towards automation, rationalisation and reusability.

In parallel to the strive towards efficiency, architectural discourse increasingly focuses on the use of computing in support of creativity including process-based design, diagramming and form-finding (e.g., cf. Aranda and Lasch, 2005; Kolarevic, 2003; Kolarevic and Malkawi, eds, 2005; Rosa, 2004; Terzidis, 2003, 2006; Zellner, 1999). A growing number of professionals and academics already work towards a reformulation of architectural practice in response to the new capabilities afforded by the digital technologies. The relevant initiatives include parametric design, simulative techniques, versioning, mass-customisation and rapid prototyping. This new tradition already began discussing architecture as broadly understood performance (e.g., cf. Kolarevic and Malkawi, eds, 2005).

Another common usage of computing in architecture is for representation, for example, in the production of moving images and virtual environments. The utilisation of these media forms becomes more widespread, yet the architectural discourse rarely recognises their expressive, narrative and creative capabilities (for some exceptions, see von Borries, et al., eds, 2007). Researchers in other fields increasingly discuss these characteristics (e.g., see Atkins, 2003; Atkins and Krzywinska, eds, 2007; Bogost, 2007; Murray, 1997; Ryan, 2001; Ryan, ed., 2004; and Surman, 2007) and while their work is lacking in specifically architectural sensibilities its insights can productively inform architects' appreciation of virtual environments as representation and places.

With an extended remit of architecture and the use of novel technologies come new creative practices. While computing is currently widely adopted in architectural practice, until recently its usage was largely utilitarian. Partially, this situation persists because of the shortcomings characteristic of the existing computer-aided design tools that provide poor support for exploratory or intelligent modelling. More fundamental is the cultural background of many architects who continue being sceptical in regard to the utilisation of computers in designing (e.g., see Dokonal and Knight, 2006, p. 811 or Frazer, 2006, p. 210) and to the societal role of technology in general. Exemplifying this scepticism, Vesely (2004, p. 249) argues that

> [a]rchitecture has been confronted with the possibility of design based on no more than an understanding of form, formal purpose, material, and technique, whose simplicity and intrinsic poverty are complemented by an unprecedented complexity of personal intentions and formalizations.

In their everyday design-practice, architects often delegate computer-related tasks to specialist computer-aided-design operators whose work is often subservient and mechanistic. The rapid technological development and increasingly higher dependence of places on digital technologies make this situation unsustainable. New ways of using computing for design, construction and maintenance have been emerging from the end of the 1990s. Much of the creative experimentation with computing in architecture is of a speculative and exploratory character as is natural in a quickly changing domain. The ease with which contemporary three-dimensional modelling software can produce intriguing and complex forms has made some people worry that architectural experimentation with digital tools might degenerate into style-rich but meaning-poor neo-Baroque, largely determined by the pre-packaged capabilities of the modelling software. I suggest that further work on computer-afforded place-making practices needs to addresses these worries by developing design-relevant theoretical-perspectives considering the role of computing in creative processes.

I.3 RESEARCH QUESTIONS AND THESIS STRUCTURE

In response to the knowledge gaps outlined above, this thesis seeks answers to research questions in three interconnected areas:

Participant Observation and Investigative Designing (Chapter II)

- Can a hybrid approach that combines participant observation and investigative designing be internally coherent and productive for studying creative design-processes in place-making?

Performative-Place Approach and Making of Places (Chapter III)

- What are places? How can the understanding of place accommodate recent technological developments and changes in social prac-

tices that affect and reshape phenomenal, experiential and lived environments?

- Can architects make or design places? What are the general requirements for a suitable creative process?

Staging Places: Creative Process and Design Computing (Chapter IV)

- Can architectural creative-design processes be suitable for staging places as recommended by my performative-place approach? What kind of creative process will that be?
- Can design computing support distributed creativity in place-making? What are the characteristics of design computing suitable for these tasks?

I.4 SCOPE AND LIMITATIONS OF THESIS

This thesis aims to contribute to the knowing and practice of architectural designers and theorists engaged with the challenges and opportunities staged by the advancements in computing. My argument depends on a shared understanding of architecture as a place-making pursuit. I recognise that many other understandings of architecture are possible and that practitioners working in commercial or corporate architecture might have incompatible interests and value systems. However, given the compatibility of basic goals, this thesis might be relevant to architects and other designers variously engaged in place-making. Potential areas of application include hybrid places for art practice, entertainment, education and business. Among the relevant disciplines are urban planning, museum design, virtual heritage and archaeology, game studies and game design, design of collaborative work places, human-computer interface and new-media design.

Because design-professionals' knowing is often of a tacit nature, contributions to design disciplines must find non-textual ways of knowledge transfer. In an attempt to satisfy this requirement, I have structured this thesis around practical case-studies that provide material for the analysis presented below. Throughout my work on this thesis, these case-studies were available to various constituencies via

published papers, public presentations, workshops and collaborations. I also exposed my work through international exhibitions, conferences, festivals, mailing lists, blogs and user forums. While not a part of my formal submission, this multi-modal dissemination contributed valuable feedback and will continue past the boundaries of my doctoral research. The case-studies, available as design precedents, will keep influencing other practitioners and illustrate my future work.

I suggest that by introducing into discourse new arguments, interpretations, observations, terms and examples this thesis engages in constructive "ontological politics" (e.g., see Mol, 1999, p. 74, also, see Law, 2004; Mol, 2002) helping to shape future performative-places. Latour (2005, p. 258) showed how sociologists "make society" by practicing sociological research:

> The ceaseless activities of the social sciences in making the social exist, in churning the collective into a coherent whole, make up a large part of what it is to 'study' the social. Every account added to this mass also consists of a decision about what the social should be, that is, on what the multiple metaphysics and singular ontology of the common world should be. Rare are the group formations today that are not equipped and instrumented by economists, geographers, anthropologists, historians, and sociologists [...].

Similarly, and in keeping with a long-standing tradition in architecture, my thesis campaigns for positive change and simultaneously influences the field of architecture by adding to its discourse. Among the perception changes made possible by the performative-place approach are the new ways to think about existing places, the widened remit of architecture (especially in accounting for new types of technology-saturated places), and a re-conceptualization of the roles played by computational tools in the creative design-processes. Examples of environments that until now received little attention from architects include virtual environments, videogames, persistent online worlds and other dynamic ephemeral and distributed places sustained by computing and communication technologies.

I had to confine my participant observation and investigative designing to a limited number of case studies most of which were relatively small-scale projects. An application of the performative-place

approach to the design of large-scale architectural environments would be interesting and undoubtedly introduce many relationships the discussion of which had to remain outside of this thesis. For example, my virtual-environment case-studies are considerably simpler than many commercial computer games or massively-multiplayer online-worlds. The complexity of my case-studies proved sufficient for the initiation of the discussion on their nature and design. However, an increase in complexity will be necessary to advance research. One possible avenue is building and testing within an existing rich context of massively-multiplayer online-games. Such a setting could provide larger environments and societies with more versatile participation, campaigning, interactivity, narrative structures and other circumstances that were lacking in my implementations.

Necessarily, my case-studies did not include many types of existing and possible places. For example, while I mention augmented interactive environments, location-based media, mobile and distributed mixed-media environments and persistent online worlds as examples in the discussion, due to the limitations on space I provide no detailed analysis of case-studies derived from these areas even though I have conducted investigations into these forms of hybrid places and studied massively-multiplayer online-games in considerable depth. I also do not include an extended discussion on multi-user dungeons and other text-based environments. I decided to focus on three-dimensional and physical environments instead. I also did not conduct case-study-based investigations into conventional, low-tech urban or architectural places even though it would be interesting to discuss them in the light of my performative-place approach. The same is true of places intended for theatrical or ritual performances.

My architectural virtual environment case-studies, *Virtual Braunstone* and *Virtual West Cambridge*, received wide exposure in presentations and workshops. However, so far the official clients have not used them sufficiently. The lack of widespread independent-usage following primary designer-inscriptions has constrained the possibilities for feedback. This situation encouraged me to question the criteria for success and utilisation of such virtual environments. The

reflection on these criteria led to better understanding of the design process and to the improved design outcomes. At the same time, I acknowledge that better utilisation by intended clients remains desirable and will constitute an important focus of the continuing work on these projects.

The design processes used for my case-studies varied but often lacked the full scope of openness and participation advocated by this thesis. The performative-place approach emerged through my practical work. Therefore, its recommendations could not affect the design decisions that preceded its emergence and maturation. Consequently, the focus of the subsequent discussion is often on the performative, negotiatory and participatory characteristics of comparatively conventional design-processes rather than on more radically collaborative, participatory approaches that it advocates. This focus provides a new perspective on existing places and place-making while creating a foundation for subsequent work.

Finally, this thesis does not attempt to produce a foundational, universal theory or generate quantitatively verifiable, generalizable results. Instead, it aims to construct a persuasive argument that can be useful in practical design situations. The next chapter presents the in-depth discussion of this pragmatic stance to theory-making.

II

PARTICIPANT OBSERVATION AND INVESTIGATIVE DESIGNING

In this chapter, I address one research question foundational to the subsequent work and ask whether a hybrid approach that combines participant observation and investigative designing can be internally coherent and productive for studying creative design-processes in place-making.

II.1 ONTOLOGICAL STANCE

In the interdisciplinary fields concerned with the study and making of places, there exist multiple academically-legitimate ontologies (e.g., see Groat and Wang, 2002, p. 32)—that is, understandings of what is knowledge—or, to put it differently—of what is the "nature of reality". While the development or even an in-depth discussion of a comprehensive ontology is far beyond the scope of this thesis, in this section I include a necessarily axiomatic assertion of what I see as knowing of places. By making this position explicit, I provide a necessary foundation for meaningful discussion and evaluation of the subsequent material.

Ontological claim

Any knowledge of places is an assembly of engagements including memories, perceptions, opinions and performances. Any knowledge of places is also constructed, subjective, fuzzy, dynamic and multiplicious. It is meaningful to speak of such knowledge as a process—as

knowing. It is meaningful to say that any knowledge of places exists in plural—as knowledges or ways of knowing—because knowledge constructions differ with people and circumstances. In other words, many subjective realities co-exist.

I accept this position as a pragmatic stance that can lead to new insights and learning. Analogously, Latour (2005, pp. 87–120) shows how it is more productive and illuminating to think of phenomena as "matters of concern" as opposed to indisputable "matters of fact". He argues (p. 114, the citation below preserve the original spelling, grammar and emphases) that the theoretical stance adopted, in particular, by actor-network theory offers

> natural objects an occasion to escape the narrow cell given to matters of fact by the first empiricism. This is what I have always found so refreshing in science studies: until its development, the conversation between philosophers, sociologists, and political scientists about the right divide between 'Nature' and 'Society' had always been illustrated by boring, routine, millenary old matters of fact such as stones, rugs, mugs, and hammers that were basically things Neanderthals could have been using already. Those objects are perfectly respectable but, as we saw in the preceding chapter, they no longer leave a trace, and thus there is no way they could appear again as mediators.
>
> The discussion begins to shift for good when one introduces not matters of fact, but what I now call *matters of concern*. While highly uncertain and loudly disputed, these real, objective, atypical and, above all, *interesting* agencies are taken not exactly as object but rather as *gatherings*. You cannot do with Monte Carlo calculations what you do with mugs; you cannot do with genetically modified organisms what you do with mats; you cannot do with quaternions what you do with black swans.

Similarly, I think that understanding places not as singular, natural phenomena but as complex and disputed assemblies opens the discussion for new observations and for significant contributions from new actants.

Ontological claim, consequence A

Places do not have true or natural forms. People cannot make true statements about places. Therefore, truth proper is not a useful concept in the study of places. The closest possible truth-like compromise useful in discourse and practice of places is intersubjectivity. How-

ever, the concept of intersubjectivity implies an agreement between parties. I think that a more attractive concept is an assembly of meanings. An assembly of meanings can achieve a balanced state without the need to mute the disagreeing voices.

Ontological claim, consequence B

The study of places cannot produce theories with undoubted capacity for falsifiability through testing as demanded by Popper (2002, e.g., p. 18) or result in a general theory with universal predictive powers in the style of the sciences. Consequently, scientific and objective evaluations of evidence in support of generalizability are unsuitable in the study of places.

As Lincoln and Denzin (2005, p. 20) wrote describing the situation with epistemologies in support of qualitative research in the 1990s, "[t]he concept of the aloof observer was abandoned. [...] The search for grand narratives was being replaced by more local, small-scale theories fitted to specific problems and specific situations." Law (2003, p. 9) similarly argues that stories about heterogeneous socio-technical relationships

> do not necessarily add up, do not necessarily come to a point. [...] Perhaps there is no single and coherent pattern. Perhaps there is nothing except practices. Perhaps there is nothing other than stories performing themselves and seeking to make connections, practical and local connections, specific links.

II.2 EPISTEMOLOGICAL STANCE

The existence of multiple co-existing ontologies in the interdisciplinary study of places necessitates the co-existence of multiple epistemologies (e.g., see Groat and Wang, 2002, p. 32), that is—ways to have knowledge—or, the "relation between knower and would-be-known". Furthermore, researchers with identical or similar ontological stances can adopt differing epistemological approaches. In this section, I provide axiomatic statements on how people can learn about places and briefly outline the implications for research. Again, clarity of epistemology is essential for meaningful discussion and evaluation

because the application of reasoning stemming from incompatible epistemological stances can lead to misunderstandings and logical blockage.

First epistemological claim

People cannot know places without an active engagement that changes their objects of study.

Ontologically, my position is close to "social constructivism", "social constructionism" and "interpretivism" (e.g., see Burr, 2003; Creswell, 2003; Crotty, 1998; Edwards and Potter, 1992; Gee, 2005; Harding and Palfrey, 1997; Potter, 2004; Rorty, 1989, 1991; Shotter, 1993). These approaches followed Wittgenstein's (e.g., see Wittgenstein, 1986) dictum that questions about meaning were necessarily questions about discourse. Epistemologically, however, my position is different from the constructivist knowledge-claims that, historically, often saw researchers as separate from their objects of study. For a powerful example of how ethnographers cannot sustain their praxis as empathetic on one hand but detached and observational on the other, see Favret-Saada's (1980) study of witchcraft. She found that, while in the field, she, as everyone else, could not escape one of the three available roles: the ones of a bewitched, a witch or an "unwitcher".

First epistemological claim, Consequence A

Because researchers always engage with the places they study, it is impossible to formulate simple, isolated research-questions. For example, laboratory experiments or targeted measurements can contribute to the multitude of knowledge constructions but not produce indisputable facts about places.

Consequently, I suggest that the study of places and place-making should broaden research questions; merge research with practice; situate research in locations, among people and in discourse; and account for the habitus and motivations of the researcher.

First epistemological Claim, Consequence B

As people cannot obtain facts or universal truths about places, successful claims for generalizability of knowing can win recognition

only through negotiations, persuasion and useful application in practice. Claims for generality depend on the width of influence they command. Professional and temporal boundaries often constrain the application of such claims.

Consequently, I suggest that the study of places should broaden dissemination among multiple constituencies; initiate and maintain ongoing exchange in discourse and through collaborations; and provide for persuasive reporting to help the others cope with subjectivities of analysis and presentation.

A possible output of a study on places is similar to what Groat and Wang (2002) describe as "normative" and "polemical" theories. "Normative theories [...] include a wide range of ways-of-doing that belong to the realm of convention, or 'rules of thumb'." (p. 78) Polemical theories are "theories that are related to design activity, and that tend to take a polemical stance that sets normative guidelines for what to do." (p. 82) "For instance, Mies's theoretical claim 'less is more'—a polemical formulation—influenced design practice for almost two generations worldwide." (p. 84)

Second epistemological claim

People cannot learn about places or contribute to place-making in one correct, naturally privileged way. Multiple ways of knowing places are possible. For example, scientific knowing is different from design knowing, practical knowing is different from abstract knowing and tacit knowing is different from explicit knowing. These forms of knowing are complementary and can be equally valuable. The scientific approach has limited applications in the domain of creativity and social practice. Practical knowing is often intuitive, tacit, nonverbal, situation-specific and fundamentally different from scientific knowing and practice.

According to Schön (1983, p. 15), "[p]ractitioners are frequently embroiled in conflicts of values, goals, purposes, and interests." This leads to situations that positivism experiences as inexplicable paradoxes:

> If it is true, for example, that social reality has shifted out from under the nineteenth-century division of labor, creating new zones of complexity

> and uncertainty, it is also true that practitioners in such fields as management and industrial technology do sometimes find ways to make sense of complexity and reduce uncertainty to manageable risk. [...] If it is true that there is an irreducible element of art in professional practice, it is also true that gifted engineers, teachers, scientists, architects, and managers sometimes display artistry in their day-to-day practice. If the art is not invariant, known, and teachable, it appears nonetheless, at least for some individuals, to be learnable. (Schön, 1983, p. 16)

The persistence of such paradoxical successes of professionals in the areas where no theories existed or seemed possible led a number of researchers to argue for the fundamental specificity of designerly knowing (e.g., see Cross, 2001, 2006; Jiménez Narváez, 2000; Lawson, 1979, 1990, 2005; Swann, 2002).

Second epistemological claim, Consequence

Researchers have to study places with methodologies that can cater for the types of knowing beyond the scientific because scientific and positivist approaches cannot explain the nature of professional knowing.

Consequently, I suggest that the study of places should develop targeted methodologies able to cater for practical ways of knowing as well as understand and utilise practice-specific criteria for rigour.

Third epistemological claim

It is difficult to share practical knowing through verbal or symbolic communication. Instead, designers learn in active practice. In thinking about design, they refer to their practices and to the practices of others seeking to find opportunities for useful exchange.

Third epistemological claim, Consequence

Study of places and place-making has to rely on practice-based, collaborative methodologies accessible to practitioners and utilising multi-modal, visual and embodied ways of communication.

Consequently, I suggest that the study of places should develop reflective, collaborative practices; develop and utilise case-study precedents for collaborative learning and dissemination; and integrate visuals and case-study descriptions into the verbal analysis.

II.3 ASPECTS OF METHODOLOGY

In this section, I provide information necessary to contextualize practice-based research and outline practical measures in support of rigour as made possible by my ontological and epistemological claims.

II.3.1 Object of study and nature of data

This thesis focuses on the study of place and the performative characteristics of this concept in experiential encounters, discursive situations and creative designing. Case-studies serve as the primary source of learning and have generated an eclectic array of material. One important type of data is the combined experience accumulated during case-study engagements. This experience resulted in various types of learning from explicit learning that is more easily convertible to language, to tacit learning that poses more significant problems for representation and sharing, to emotional learning that experients cannot readily convert into words or other symbols. For example, I have 1) accumulated multiple memories of various places including mental images and narratives of interpersonal encounters; 2) acquired skills in different or sometimes contrasting ways of being specific to various physical and digital places; 3) developed and experienced a range of design techniques intended to contribute to the tasks of place-making; 4) become proficient with software tools and learnt about their roles in the creative process; and 5) obtained experience in logistics of design and construction. Traces of my participations, including design-process artefacts such as client briefs, statements of intent and progress, sketches, sets of digital and analog documents tracing bifurcating branches of design development through multiple prototypes (e.g. three-dimensional models, textures, two-dimensional drawings, animation tests, physical scale-models, snippets of code and completed scripts), traces of technical research and development, textual and visual traces of communications with other participants, clients and collaborators, notes of meetings, production workflows supported by custom-built tools and production schedules constitute another important type of data. Finally, designed artefacts including implementations of virtual environments, an interactive installation and a

prototype of a location-specific dramatic game also constitutes analysable data.[1]

II.3.2 Position of researcher

During my doctoral research, I have engaged in a variety of roles, from a participating observer to the principal investigative-designer.[2] In this participatory work, I did not set out in pursuit of pure knowing but wanted to help the development of architectural practices thus adopting an activist, goal-oriented stance towards research.[3] I wish for architecture to remain useful in its traditional area of application and to widen its remit to include newly emerging socio-technical practices. This partisan attitude has motivated and coloured all aspects of my research. Contrary to positivist and scientific approaches, I believe that goal-oriented, involvement-based, participatory access to knowing is not only compatible with the challenges of research into creative place-making but is an essential requirement for its utilisation in practice. In the study of hybrid places, an inquiry driven by goal-oriented action is more obviously useful to other practitioners than that based on an attempted disinterested-stance. My campaigning on behalf of architectural tradition and my work in pursuit of practical goals has helped me to maintain constructive relationships between close-range research goals, practical design-action and loftier global aspirations.

II.3.3 Research questions

The research questions of this thesis emerged from my practice. Rather than tackling narrow problems defined before the commencement of the research effort, these research questions engaged with the complex, emergent challenges of creative practice. This focus was con-

1. Descriptions of case-studies provide further information on the types of data used in the analysis of each case-study (p. 50 et seq. and p. 84 et seq.).

2. Descriptions of case-studies provide further information on the particulars of my participations (p. 50 et seq. and p. 84 et seq.).

3. Goal-oriented research poses a problem: how can a researcher identify a positive action? To address this difficulty, Heron and Reason (1997) argued for the inclusion of axiology into research paradigms. They proclaimed human flourishing within a prospering ecosystem as a goal worthy to drive the research. The task of being consistent with this goal is morally relevant, technically interesting and conceptually difficult. A proper development of this theme is a major undertaking that I had to leave beyond the boundaries of this thesis.

sistent with my view of creative practice as not primarily focused on problem-solving but as concerned with managing complexity, uncertainty, instability, uniqueness and conflict in dynamic social settings irreducible to isolated cognitive or behavioural responses. I argue that this basis in practice makes my research more relevant and useful to other practitioners.

My initial research questions were broad and open-ended. I took them into practice with an opportunistic approach towards inquiry, expecting that I might have to reformulate them in response to my experience in the field. In the course of my work, I repeatedly reshaped these research questions in response to phenomena and theory emerging from collaborative practice, reflection and reading. Sociologists and anthropologists often employ open-ended strategies to solicit unanticipated views. Similarly, I set out to learn from my case-studies with anticipation of unexpected discoveries.

II.3.4 Knowledge production

Bryman (1989) summarized that qualitative-research methods produce

> a different form of knowing in which people's understandings of the nature of their social environment form the focus of attention, a focus which contrasts sharply with the tendency in much quantitative research to treat facets of this environment [...] as pre-existing 'objects' akin to the physical or biological matter on which natural scientists work.

The focus on socially-constructed, contingent knowing requires methodologies that can tackle complex and dynamic in-the-world situations. For example, Latour (2005, e.g., p. 227) insisted that in social research, "the only viable slogan is to 'follow the actors themselves'". Following analogous principles, I relied on inductive approaches deriving my arguments from observations of and engagements with actants rather than (or as much as) from pre-existing ideas on space and place.

However, in addition to inductive ethnographies' strong emphasis on data (Alvesson and Sköldberg, 2000, p. 46), my engagement with case-studies also emphasises reflection and interpretation. Reflexive methodologies acknowledging that research processes engage in the

social construction of the worlds they set out to study and that these worlds include their researchers have gained recognition in many academic fields (e.g., see Alvesson and Sköldberg, 2000; Etherington, 2004; Steier, ed., 1991). As Alvesson and Sköldberg (2000, p. 5) explain, the focus on the primacy of interpretation

> implies that all references—trivial and non-trivial—to empirical data are the results of interpretation. Thus the idea that measurements, observations, the statements of interview subjects, and the study of secondary data such as statistics or archival data have an unequivocal or unproblematic relationship to anything outside the empirical material is rejected on principle. Consideration of the fundamental importance of interpretation means that an assumption of a simple mirroring thesis of the relationship between 'reality' or 'empirical facts' and research results (text) has to be rejected. Interpretation comes to the forefront of the research work. This calls for the utmost awareness of the theoretical assumptions, the importance of language and pre-understanding, all of which constitute major determinants of the interpretation.

Expanding their explanation, they also write that

> [t]he second element, reflection, turns attention 'inwards' towards the person of the researcher, the relevant research community, society as a whole, intellectual and cultural traditions, and the central importance, as well as problematic nature, of language and narrative (the form of presentation) in the research context. [...] Reflection can, in the context of empirical research, be defined as the interpretation of interpretation and the launching of critical self-exploration of one's own interpretations of empirical material (including its construction). Reflection can mean that we consistently consider various basic dimensions behind and in the work of interpretation, by means of which this can be qualified. (Alvesson and Sköldberg, 2000, p. 5, 6)

The interplay of induction and reflection in the preparation of this thesis had a structure of a multi-threaded, heuristic, open-ended inquiry similar to those of design processes. I mixed reading and theorizing with case-study work. Case-studies of different length and complexity overlapped in time and topics. However, within this complex flow each case-study included research-stages compatible with Kolb's (1984) stages of experiential learning or Scrivener's (2002) suggestions on the flow of practice-led research projects. Each case-study began with reflection on my previous participation and practice. Commencement of a new case-study also gave me an opportuni-

ty to question the appreciative system that guided my practical work thus far. This reflection exposed gaps and biases in my understanding of theory and appreciation of practice. I was also able to identify concerns and topics for future work. I supported this reflection with further learning about the relevant theory and practice. Products of my reflection, combined with this effort of information-gathering enabled me to reframe my concerns and adjust my theoretical position. This preparation enabled me to engage in designing and making. Throughout, I retained the reflective attitude and persisted with information gathering during the productive or participatory period of my case-studies. After the project, or its significant part, was complete, I reviewed the material and reflected on action and practice, looking for theoretical outcomes and preparing for the next cycle of practical work. At each cycle, I also reviewed my reflective practices and made adjustments where necessary.

This research procedure is compatible with the exploratory flow of the design process and not only can successfully function in conjunction with it but is also able to support design processes and help to retain the insights emerging through designing. Designers impose on the given situation an arbitrary order, consider the implications of this move and undertake further moves if necessary. Each design-move is a local inquiry that contributes to the global experiment of reframing the problem. In this sense, designing is a reflective dialogue with practical or imaginary situations. Designers, collaborators and observers all learn in the process by familiarising with and adapting to the unexpected. Supporting design experimentation with systematic documentation and reflection can help to make this learning useful in research contexts.

While engaging in designing as a research method, I organised multi-modal data collection that was more consistent, extensive and inclusive than that usually used by design practitioners. For example, in professional practice, undesirable outcomes of design moves require reflection and readjustment of action or theory-in-practice while desirable outcomes do not necessitate reflection even if practitioners encounter unexpected outcomes (Schön, 1983; Scrivener, 2000). By

contrast, investigative designing can gain knowing not readily available to practitioners by reflecting on all types of outcomes.

Participant-observation approaches constituted one significant mode of data collection. Adopting participant-observation approaches to the research in architecture, and following recommendations of inductive approaches on the importance of multi-modal data (Dick, 2005; Glaser and Strauss, 1967), I collected observations in diaries, compiled textual and visual logs, collected survey drawings, mood sketches and photographs. I also collected publicity materials, artists' notes, user-forum and mailing-list discussions, mass-media commentary and other secondary-source content. During the analysis stage, I revisited this material and used it to derive comparisons and interpretations.

In a methodological move, usually inaccessible to sociologists or anthropologists because they rarely engage in designing as designers, I used observational case-studies to complement the insights afforded by investigative designing. Participant observation allowed me to become involved with situations beyond those I could implement as practical prototypes. For example, my study of games and massively-multiplayer online-worlds allowed me to look at environments more complex than those typically built by academic researchers, architects or property developers. The learning and experiences of observational case-studies taking places in parallel with investigative designing continuously informed my creative work. For example, I used the *Klütterkammer* case-study to enrich my understanding of a mixed-media environment as a performative situation and the observations derived from this engagement informed my theoretical position and design work during *The Parasite* case-study. I suggest that indwelling occurring in the midst of designing generates a peculiarly focused kind of vision that acknowledges and casts as meaningful issues and concerns that might easily pass unnoticed in more detached situations. The focus gained through engagement in designing can usefully inform and guide observational research.

In addition to participant observation, I engaged in practical design-work cast, for the purposes of my research, as investigative de-

signing (cf. Durling and Niedderer, 2007; Rust, 2003). The activity of investigative designing included early surveying for design opportunities, preparation, development, implementation and utilisation of designed situations. Utilisation of investigative design in research practice is relatively new and still actively debated. Many researchers agree that designing contributes a unique type of knowing unattainable with academic methods common in sciences or humanities (e.g., see Cross, 2001, 2006; Nelson and Stolterman, 2002). Furthermore, many are of the opinion that design can also contribute unique knowing in academic-research contexts because unlike other research methodologies it engages in making rather than only in descriptions of the existing phenomena (e.g., see Dilnot, 1999). However, others, while sharing the appreciation of designerly contributions to knowing worry that design practice unsupported by systematic data collection is inadequate in academic and, more specifically, doctoral research especially where there is no sufficient written-articulation of research questions, methods and contributions (e.g., see Durling, 2002; Durling and Niedderer, 2007). In agreement with these concerns, I incorporate systematic approaches and methodological reflexivity in support of my design practice.

I do not adhere, however, to the position demanding research-only orientation of investigative designing. For example, Durling (2007, p. 3) emphasised that investigative designing must be "set wholly within a research study [...]". By contrast, while some of my case-studies existed in order to address specific research issues, others combined multiple goals and constraints. For example, *Virtual West Cambridge* and *Virtual Braunstone* continue to serve a number of socially important roles apart from my or others' research concerns. I suggest that integration of investigative designing with wider design-goals, development workflows and modes of utilisation gives opportunities for observation of social circumstances and propagation of influence impossible in purely academic projects and essential in an activist study of places.

II.3.5 Reporting

In an effort to present my research rigorously (e.g., Lewins, 1992 or Robson, 2002 for commentaries on the nature of rigour in research), my reporting shows how my research focus and my appreciation of research outcomes developed over time.

My reporting also acknowledges the participatory quality of research by providing information on the circumstances of my case-study production. This approach allows me to account for a wider scope of participants, influences and motivations than is customary in design reporting. This information strengthens the credibility of my analysis by allowing readers to appreciate connections between my writing and the world this writing describes.

Among others, Alvesson and Sköldberg (Alvesson and Sköldberg, 2000) and Tindall (1994) have discussed the need to expose the details of researcher involvements in qualitative methodologies and Scrivener (2002) comments on the same need in creative-practice research. Interrogation of one's own methodologies and textual practices exposes biases helping to discover tendencies inherent to the material. In response to this need, my reporting includes information on my background including the outline of my expectations, motivations and goals. I also clarify my role in each case study, explaining, for example, whether I was a spectator, a player, an author or another type of participant. Furthermore, I provide information on my data-collection techniques and discuss my methods of analysis. Openness about data collection can help readers to construct their own impressions of the case-studies and evaluate the consistency of my reflective practices. In the process, readers can generate alternative interpretations of the case-studies in references to their habituses and interests. They also can gain a chance to see reflective practices in action thus informing and extending their own practice-based research repertoires.

In an effort to make the role of the researcher explicit to the reader, I used first-person writing as a rigorous alternative to the impersonal, objectivist styles incompatible with my constructivist[1] theoretical

1. An alternative, common term is "constructionist". In my usage they are synonymous.

stance. First-person reporting belongs to a comparatively recent but by now well-established and well-justified tradition in academic writing (e.g., see Oliver, 2004, p. 64; Wolcott, 1990, p. 19, 2005, p. 197).

The incorporation of the author figure into the text is insufficient if academic writing remains detached from field work. Therefore, in addition to including myself in the text, I integrate the process of reporting into the multi-strand and multi-cycle structure of practice-based research work. I wrote and prepared images for this thesis and relevant other papers in parallel with exploratory experimentation and data collection.

In addition to the effort of combining reporting with practice, I have sought to emphasize how my practical work informed my theory. In support of this goal, I have alternated discussions of theory and accounts of practice. In theoretical sections, I introduce concepts and provide context for the case-studies. In practical sections, I present case-studies as situated experiences that field-tested my theoretical statements and motivated new insights.

Even though I have made my case-studies available to other practitioners and researchers, I have avoided including design artefacts or hybrid places as formal components of this thesis. The academic community now permits inclusions of non-textual material into reporting of research outcomes (e.g., see Research Assessment Exercise 2001, publ. in 1999; Research Assessment Exercise 2008, publ. in 2005 and 2006). However, methodologies and practices of such inclusions remain controversial. I could not attempt such inclusions without further research into issues of preservation and access to located and interactive work. Therefore, instead of trying to include actual places into my doctoral submission, I rely on textual and visual reporting providing focused descriptions of significant or exemplary situations.

II.3.6 Criteria and verification

Heron (1996, p. 158) argued that "[t]he outcomes of a co-operative inquiry are valid if they are well-grounded in the forms of knowing—practical, propositional, presentational, experiential—which support

them." In compliance with this stance, my research has benefited from an engagement with multiple forms of knowing: 1) propositional—I read and collaborated with others to establish research topics, questions and methods suitable for my case-studies; 2) practical—I reflected on these propositions through my collaborative practice and participation in places, extending my repertoire as a practitioner and influencing the practice of others; 3) experiential—applying the propositions to practice, I encountered unexpected experiences; and 4) presentational—I interpreted these experiences as significant patterns and disseminated the results among peers.

I accept dissemination, peer recognition and utilisation as the measures of quality for practice-based research (cf. Biggs, 2004; Eraut, 2003). In accordance with my ontological stance, I have not sought true and general answers but have strived to influence the ideas and actions of my audience. I have taken part in multiple collaborative projects and discursive public events that have exposed my ideas to the scrutiny of multiple constituencies and helped me to influence professional practices of others. I have collected feedback in the form of interviews, discussions, brain-storming sessions and public presentations. Research funding, contracts for services and requests for consultancy have confirmed the usefulness of the outcomes emerging from my investigative-design practice.

In preparation of this thesis, I sought to ensure that my theoretical approach was 1) internally consistent; 2) externally coherent or compatible with existing theoretical approaches or complementary to their contributions; 3) applicable as an interpretative device in relationship to my case-studies; and 4) transferrable or applicable for explication of phenomena beyond my case-studies.

I verified the above criteria using: 1) personal judgement and applicability to my personal practice as well as feedback from my academic supervisor and colleagues; 2) responses to my publications including those from peer reviews; 3) observations made through personal experiences and collaborative practice; 4) informal interviews with various stakeholders including colleagues and clients; and 5) feedback received during public presentations, seminars and practice-based

workshops.

Collection of pluralist feedback helped me to verify my theoretical stance via peer-acceptance by asking whether my conceptual approach appeared acceptable to experienced designers and whether the practical techniques developed through the case-studies could extend designers' creative repertoires.

II.4 RESEARCH METHODS APPLIED

During the work on this thesis, I have considered a number of case-studies that followed the common methodological foundation as discussed above. These case-studies included: 1) *Virtual West Cambridge*—a real-time three-dimensional representation of a large-scale, long-term architectural development (p. 311 et seq.); 2) *Virtual Cuthbert Hall*—a real-time three-dimensional representation of an imaginary college (p. 322 et seq.); 3) *A Warning for the Curious: Detecting the Spirits of King's College*—a spatial, narrative thriller-game using mobile devices to augment and dramatise physical locations (p. 326 et seq.); 4) *Virtual Braunstone*—a virtual-environment representation of a Health and Community Centre (p. 331 et seq.); 5) *It's a Parasite!: Cambridge University Moving Image Studio Pavilion* (aka *The Parasite*)—an augmented-reality installation featuring a cellular architectural-structure (p. 68 et seq.); 6) *Shenmue II*—a commercial, navigable, real-time, single-player, role-playing/adventure game (p. 304 et seq.); 7) *Star Wars Galaxies: An Empire Divided*—a commercial, persistent, online, three-dimensional world (p. 307 et seq.); and 8) *Klütterkammer*—a non-commercial, multi-media art-exhibition (next page et seq.).

In this section, I discuss the methods I employed in two of the several case-studies considered in this thesis. These two case-studies *Klütterkammer* and *The Parasite,* are among my more important examples and the methods employed in researching them give an idea of my methodological attitude towards the other case-studies. Further information on the case-studies beyond *Klütterkammer* and *The Parasite* is included in the Appendix (p. 304).

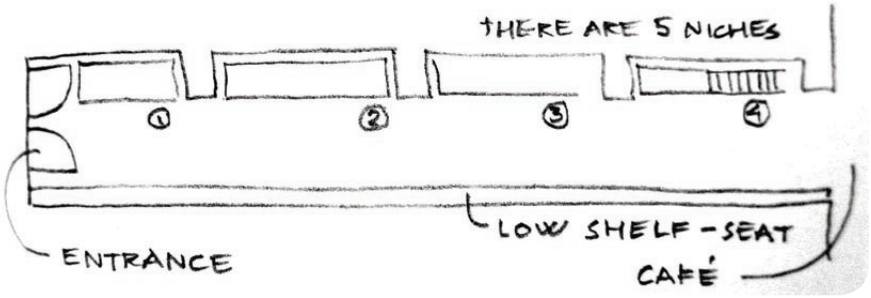


Fig. 1. *Klütterkammer.* The Institute of Contemporary Art. The layout of the corridor housing plywood constructions, "boxes", as containers for moving images. The numbers mark individual installations set in the existing niches. (on-location sketch)



Fig. 2. *Klütterkammer.* Hall layout. View from the entrance side. The space behind the entrance wall was of rectilinear shape. There was a two-level construction in each corner—eight distinct rooms altogether. The centre of the space was an open double-height area. Each room had distinct characteristics: different spaces, access points, materials, lighting, sounds and even smells. A network of variously inclined ducts of different lengths and widths connected the rooms. Visitors and invigilators populated the installation. The environment hosted photographs, sculptures, video projections and video monitors. (photograph courtesy Claire Fitzsimmons of Institute of Contemporary Art)

II.4.1 Participatory observation in the Klütterkammer case-study

Klütterkammer was a non-commercial art exhibition that was accessible between 24 September and 7 November 2004 at the Institute of Contemporary Art in London (ICA). Designed by the German artist John Bock, it included his and other artists' visual works. John Bock created an unusual environment that occupied three interconnected exhibition areas in the ICA building: Concourse Gallery, Lower Gallery and Upper Gallery.

The unsigned leaflet that was available at the Institute of Contemporary Art during the exhibition, and a copy of which I retained in my personal collection, begins with Bock's epigraph: "This is my history." After providing the names of other participating artists, it continues to describe the event as follows (the citation preserves the original spelling and grammar):



Fig. 3. *Klütterkammer.* **Hall layout. View towards the entrance side. The hall functioned as a structure of overlapping networks. One network was that of navigational paths—it existed in two levels with vertical links. The other was the network of visual access. The third was the network of conversations, noises and sounds. These networks overlapped in a contrapuntal manner creating a rich field of loosely defined affordances and provocations. Images shown in fig. 2, previous page and fig. 3, this page, are publicity photographs. They do well showing the sculptural characteristics of the installation but misrepresent the pattern of involvements as encountered by the visitor because they show the rooms devoid of people and from positions unusual for visitors of the exhibition. These photographs portray the exhibition as a selection of interesting objects missing its success as an experiential field of provocative place-events. (photograph courtesy Claire Fitzsimmons of Institute of Contemporary Art)**

> For his first major exhibition in the UK, German artist John Bock has approached the format of the solo show in a highly idiosyncratic way. Rather than presenting a survey of his films, performances and installations produced since the mid-1990s, Bock has conceived an exhibition which reviews his major interests and influences. The title Klütterkammer, refers to Bock's upbringing on a remote farm in northern Germany where it designates an area used as a storage or working environment. In a similar fashion, Bock has treated the ICA galleries as an enormous thinking and play space.
>
> Bock's work is unique, if not peerless, and eludes any form of categorisation. In his practice, the artist samples a diverse range of artistic and non-artistic disciplines resulting in disordered and often absurd connections. Mixing art references with theatre, economics and fashion, Bock has realised a vast and often anarchic collage that amplifies the chaos of the everyday and reaffirms the contradictions of an unknown reality that exists beyond our common understanding of the world. Klütterkammer continues the artist's frantic investigation into the possibilities for how we experience and make sense of the world. Avoiding a single position on that attempts to rationalise contemporary art or thinking, the artist has created an unrestricted installation full of intentional inconsistencies that never aims at reaching any form of conclusion.
>
> Within the Lower Gallery of the ICA four seemingly haphazard buildings, connected by a series of crawl spaces, ladders and walkways, have been constructed with everyday materials from hay bales to aluminium foil, textiles to scaffolding. Into these structures, Bock has assembled a surreal collection of artworks, appropriating sculptures, paintings, films and artefacts.

Engaging in participatory observation in the *Klütterkammer* exhibition, I aimed to study boundaries of artworks and mixed-media items, their situated nature and emergent meanings. I also intended to observe the social construction of places and objects, performative engagements between people and other actants and role distribution between humans and non-humans. On a more tactical level, I was also interested in *Klütterkammer* as an suggestive environment providing a variety of situations integrating media and representations with architectural structures. As a place, *Klütterkammer* deserved special attention because of its prominent and openly acknowledged performative character. While, to my knowledge, no advanced digital technologies were utilised in its design and construction, *Klütterkammer* was innovative as an architectural structure and as a so-

cial provocation. By condensing and highlighting the significance of the performative in places, these innovations made the *Klütterkammer* exhibition particularly valuable as an illuminating case-study in my discussion on place-making.

In the context of the present discussion of methodology, the *Klütterkammer* case-study is interesting as an example of participatory engagement and data collection. Analogously to many ethnographers and anthropologists, I think that particular research methods should emerge in response to the specific challenges encountered in situations under study. For example, McGuigan (1997, p. 2) insisted that "as most good researchers know, it is not unusual to make up the methods as you go along. The methods should serve the aims of the research, not the research serve the aims of the method." In accordance with this stance, I have developed a range of research methods specific to the *Klütterkammer* case-study. Some of these methods continued from other case-studies and others emerged in response to the performative encounters with the unusual environments of the *Klütterkammer* exhibition. While these research methods cannot be taken as generalizable and reusable recipes, they can be useful to others as the evidence of self-reflection and a demonstration of possible gaps, limitations and biases. I intend the discussion in this section, in combination with the discussion of the *Klütterkammer* environments later in the text, as an illustrative precedent that can be suggestive in the development of new observational, participatory and presentational practices in architectural research and practice.

Research methods employed in my encounter with *Klütterkammer* are parallel to the ethnographic techniques of engagement and learning explored by researchers interested in post-realist methodologies and involved in the initiatives known as "visual anthropology", "visual sociology", "visual studies" and "visual analysis" (e.g., see Banks, 2001; Chaplin, 1994; El Guindi, 2004; Grimshaw, 2001; Grimshaw and Ravetz, eds, 2005; Knowles and Sweetman, eds, 2004; O'Neill, 2002; Pink, 2005, 2007; Van Leeuwen and Jewitt, eds, 2001).

Pink (2007, p. 22) offers a compatible understanding of ethnography not as a specific and limiting method of collecting data but

> as an approach to experiencing, interpreting and representing culture and society that informs and is informed by sets of different disciplinary agendas and theoretical principles. Rather than a method for the collection of data, ethnography is a process of creating and representing knowledge (about society, culture and individuals) that is based on ethnographers' own experiences. It does not claim to produce an objective or truthful account of reality, but should aim to offer versions of ethnographers' experiences of reality that are as loyal as possible to the context, negotiations and intersubjectivities through which the knowledge was produced. This may entail reflexive, collaborative or participatory methods. It may involve informants in a variety of ways at different points of the research and representational stages of the project. It should account not only for the observable, recordable realities that may be translated into written notes and texts, but also for objects, visual images, the immaterial and the sensory nature of human experience and knowledge.

In accordance with this understanding, during the *Klütterkammer* case-study, I acted as a participant observer and was responsible for the selection of the setting, the formulation of the research questions as well as for the collection, analysis and presentation of all research material discussed in this thesis. My work on *Klütterkammer* involved reflective approaches to analysis, hermeneutic approaches to knowledge creation and representation.

Discussing reflexivity in ethnographic research, Pink (2007, p. 23) suggests that

> [a] reflexive approach recognizes the centrality of the subjectivity of the researcher to the production and representation of ethnographic knowledge. Reflexivity goes beyond the researcher's concern with questions of 'bias' or how ethnographers observe the 'reality' of a society they actually 'distort' through their participation in it. Moreover, reflexivity is not simply a mechanism that neutralizes ethnographers' subjectivity as collectors of data through an engagement with how their presence may have affected the reality observed and the data collected. Indeed, the assumption that a reflexive approach will aid ethnographers to produce objective data represents only a token and cosmetic engagement with reflexivity that wrongly supposes subjectivity could (or should) be avoided or eradicated. Instead, subjectivity should be engaged with as a central aspect of ethnographic knowledge, interpretation and representation.

Similarly, I do not accept that the interpersonal reality is accessible and recordable through scientific methods. Instead, the interrelated subjectivities between the researcher and the other participants pro-

duce an interpretation of events that enters the discourse and contributes to the negotiated understanding of the phenomena in question. My participatory encounter with the *Klütterkammer* exhibition involved multiple, complex and intertwined involvements that mixed together a number of social roles and modes of engagement (fig. 4, next page). A stronger association with any of these roles can produced a differently predisposed account of events and experiences. Moreover, my involvements with *Klütterkammer* are only a small portion of many place-making encounters associated with this place. Experiences and impressions of other participants can be as complex and can differ from mine either slightly or considerably. In his introduction to the influential compilation of articles collectively entitled *Writing Culture* (Clifford and Marcus, eds, 1986), Clifford (1986, pp. 6, 7) argued that ethnographies are constructed narratives or, in his word, "fictions" (on the constructedness of ethnographic knowing also see Burgess, 1984; Ellen, ed., 1984). He acknowledged that

> [t]o call ethnographies fictions may raise empiricist hackles. But the word as commonly used in recent textual theory has lost its connotation of falsehood, of something merely opposed to truth. It suggests the partiality of cultural and historical truths, the ways they are systematic and exclusive. [...]
>
> [T]he maker (but why only one?) of ethnographic texts cannot avoid expressive tropes, figures, and allegories that select and impose meaning as they translate it. In this view, more Nietzschean than realist or hermeneutic, all constructed truths are made possible by powerful "lies" of exclusion and rhetoric. Even the best ethnographic texts—serious, true fictions—are systems, or economies, of truth. Power and history work through them, in ways their authors cannot fully control.
>
> Ethnographic truths are thus inherently partial—committed and incomplete. This point is now widely asserted—and resisted at strategic points by those who fear the collapse of clear standards of verification. But once accepted and built into ethnographic art, a rigorous sense of partiality can be a source of representational tact.

In accordance with this stance, I acknowledge the incomplete and piecemeal nature of my material. Apart from the theoretically unavoidable incompleteness and bias, this character of my material was necessitated by my direct participation in the *Klütterkammer* situations. The need to be physically engaged and psychologically alert

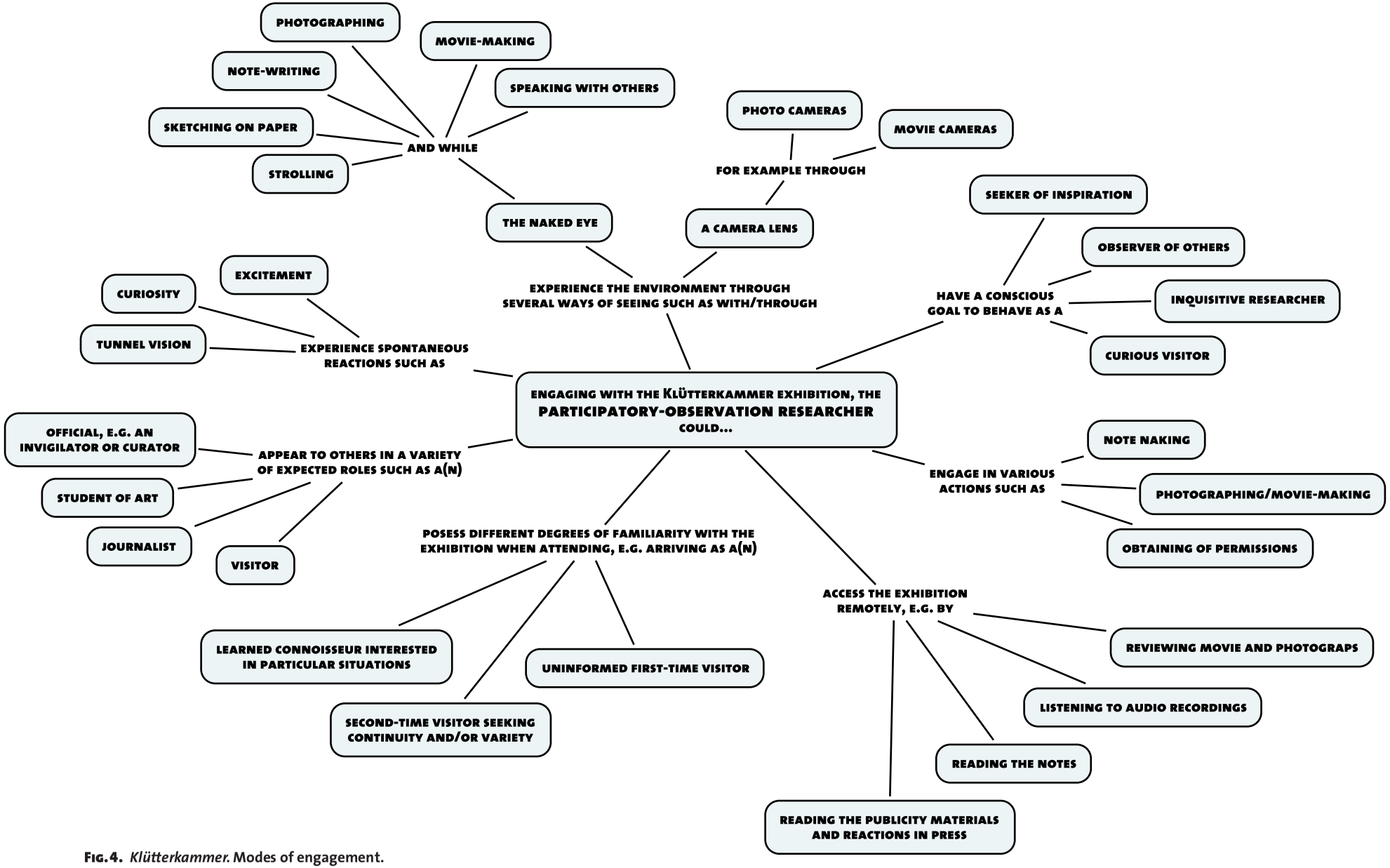


Fig. 4. *Klütterkammer.* Modes of engagement.

in the midst of action makes collection of material more difficult as such activities as systematic note-taking or photographing can interrupt the flow of the experience distorting the researchers' impressions and making their interpretations further removed from those of other participants. While I acknowledge that, as any other person's account, mine is only one of many possible stories, I also suggest that my experience in the *Klütterkammer* environments is interesting as a closely observed and well documented version of the events. Having attended the exhibition with research purposes, I made sure to reflect on the patterns of knowledge construction characteristic of my involvements. These reflections helped me to collate the many versions of events emerging from my multiplicious involvements into more representatively balanced accounts than those that could be produced by others without the research focus and the accompanying research methods. While my knowing of *Klütterkammer* as well as my efforts at representing-while-remaking this knowing for the purposes of this thesis are necessarily subjective, as other forms of knowing they inevitably have composition and history that are shared with, and, therefore, indirectly representative of the knowing of others. Similarly to the accounts developed through communications with overt informers, my reporting emerged through collaborative engagements with other participants even though these engagements did not take the algorithmic and, therefore, constraining forms of statistical sampling, questionnaires or formal interviewing. While I have not conducted any formal or systematic verbal interviews, I have engaged in various other forms of verbal and non-verbal communication with the other actants while attending the *Klütterkammer* environments. These communications included some informal interviews as well as other performative transactions that involved, for example, meaningful exchanges of information, emotions or social statuses. In the context of my overarching research goals questioning the powerful, habitual foundations of the thinking on places and aiming at the encouraging of a new approach to the understanding of places in architecture, the flexible, probing and informal techniques of participant observation seem more appropriate than more precisely specified inquiries that

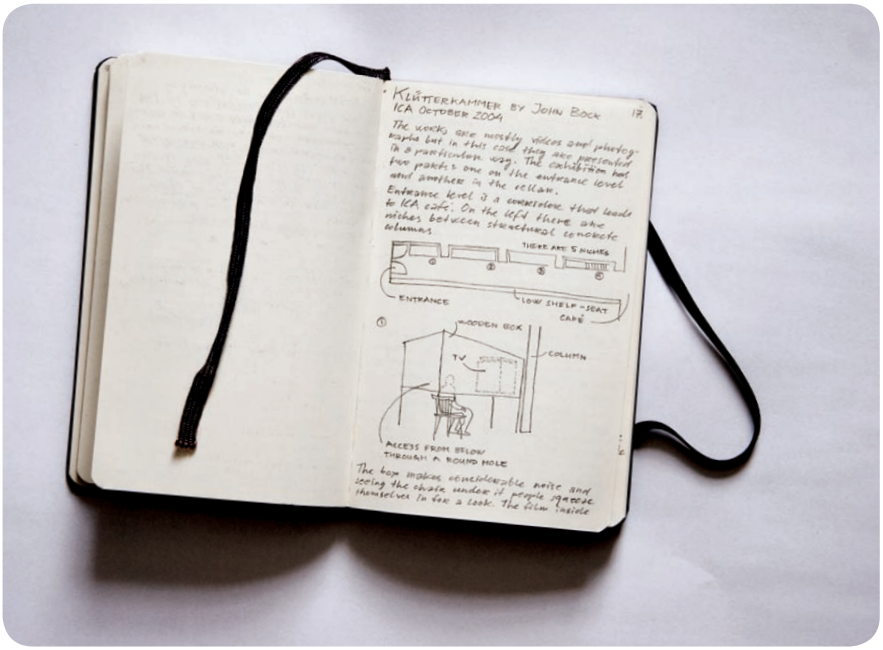


Fig. 5. *Klütterkammer.* **Notes and sketches taken while exploring the exhibition. (photograph)**

might become suitable in future work but are dangerous in the early stages of ideation because of their influential, and potentially distorting, existing systems of relationships and processes.

I travelled to London to attend the *Klütterkammer* exhibition three times, each time taking a full day for the experience. Each of the three visits had a distinct character and resulted in the collection of differently suggestive, variously biased, complementary material.

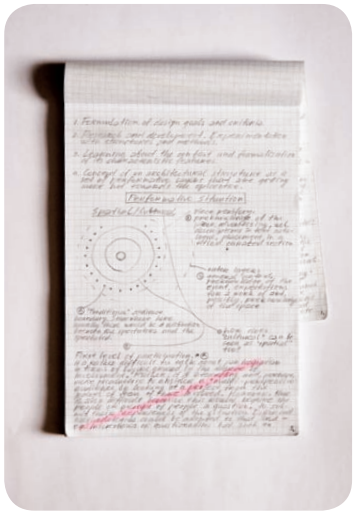


Fig. 6. *Klütterkammer.* **Journal and analytical notes taken while visiting the exhibition and between visits. (photograph)**

I first attended the *Klütterkammer* exhibition without previously knowing of its existence. Rather than coming for a particular show, I came to the Institute of Contemporary Art because I knew that it often held interesting exhibitions. Consequently, my first encounter was not strongly coloured by a premeditated agenda. As usual, I was alert to the possibility of finding something that could be relevant to my creative work and research and I quickly realised that the *Klütterkammer* exhibition was an interesting example of a performative place. At this point I did not know that later I would decide to develop my encounter into a research case-study. While my background and interest in performative places heightened and directed my attention, the primary emotions came from the encounter with the environment that was strikingly unusual. From subsequent observations and discussions, I assume that during my initial exploration of *Klüt-*

terkammer, I experienced emotional and perceptual challenges similar to those of many other visitors. However, in my discussion of the *Klütterkammer* exhibition, I do not argue that my experiences of its environments can be extrapolated into general statements on experiences of other people or into universal pronouncements on the effects caused by architectural situations. Despite acknowledging this limitation, I do suggest that having shared with other visitors the idiosyncratic range of physical and social situations while in *Klütterkammer,* I gained access to some foundational experiences that characterised this place for many people and could, therefore, usefully motivate and inform my subsequent reflection on the social construction of performative architectural-environments. Already during this first visit, I took time to observe the behaviour of other actants, took some textual notes (e.g., see fig. 6, previous page) and drew some sketches (e.g., see fig. 5, previous page and fig. 6, previous page). I often do this in other situations and this behaviour is also not unusual for exhibition attendees. After this first opportunistic encounter, I felt that I only had a very limited impression of the *Klütterkammer* environment. I was intrigued by its performative characteristics and its the capacity for varied social encounters. These encounters could only occur serendipitously and some of them took time to grow and develop into meaningful experiences. Therefore, I decided that I had to come again and spend a longer time in *Klütterkammer* in order to give justice to its potential as a spectacle.

Having recognised the relevance of *Klütterkammer* for my research during the first visit, I kept thinking about it when back in Cambridge and decided to see if I could develop it into a representative case-study within the framework of my doctoral research. In order to help with this process, I reviewed the preliminary, spontaneously collected material and made an effort to write down ideas and observations that my notes and sketches together with my fresh memories suggested. Realising that it would be interesting and useful to attend the exhibition again, I also attempted to classify the relevant issues and characteristics of this place. This effort of classification took the form of brainstorming during which I wrote down issues, questions

and categories as they emerged from the reflection on my recent experiences in the exhibition and from the already collected traces of my visit. After accumulating an initial mass of potentially interesting issues, I began organising the categories using such techniques as mind mapping and concept mapping. This stage of reflection helped me to prepare my subsequent experiential engagement by focusing my attention on the situations and associated concerns that could be easily passed unnoticed in the midst of action. In parallel, I explored the publicly available information on the exhibition and its designer and became more aware of its declared goals. At this stage, I also contacted the exhibition curator and obtained permission to collect further photographic and moving image material thus formally casting myself into the role of a researcher.

Having done this preparatory work, I attended the exhibition again. This time I spent several hours in the environment, following the emergent events, observing recurring sequences and comparing conditions. Having already-prepared, preliminary categories at hand helped me to structure the experience by suggesting engagements in new locations or with differently focused attention. During this period of participatory observation, I also made mental and recorded notes on my exploratory system of categories and issues adjusting and extending it as seemed fit in close locational and temporal proximities to the action. During this visit, I collected versatile records that included photographs, moving images, textual notes and sketches. This material captured and reflected upon the exhibition's places, objects, support personnel and the behaviour of its visitors. After the visit, with the help of my earlier categorised notes, I was able to organise this material and select several representative sequences that captured characteristic moments and could highlight aspects of situated performances not previously discussed in my other case-studies.

Engaging in the work of recording and analysis can be disruptive to the immersive experience of place. However, engaging with the environment via photographing, videoing, writing or sketching does not necessarily make note-taking observers more detached and, on the contrary, can also result in a state of flow (cf. Csikszentmihalyi, 1996)

characterized by heightened awareness towards the surroundings. In my second visit to the *Klütterkammer* exhibition, the analytic tasks of focus selection, documentation and on-the-spot analysis were interspersed with periods of in-flow, unselfconscious and improvisatory seeing-through-a-medium efforts. These periods allowed me to perform recording of experiences while being fully engrossed in the events thus collecting rich material for subsequent scrutiny.

The second visit generated a large number of personal experiences and representational traces that I reviewed while back in the studio. This reviewing took the character of searching for conceptually suggestive encounters. Having established the situations that promised to be revealing in further analysis and thus deserved additional attention, I attended the *Klütterkammer* exhibition for the third time, now focusing on several specific sequences, verifying the outcomes of previous reflections and collecting additional material necessary for representation. My close observation of these chosen situations recorded their mise-en-scène including geometry of the location, routes of access, lighting and lines of visions, visual appearance of the objects, lighting parameters and other characteristics. Having already produced general notes on the performative characteristics of these situations during my earlier visits, I now focused on the chains of sequential events. Typically, I would select a participant, such as a visitor (or a group of visitors), an official or myself, and attempt to follow their actions as closely as possible noting, so far as it was possible, all of their interactions with the environment. Video recordings were particularly helpful in this task because they would capture the details not apparent in the moment but discoverable during the subsequent analysis. However, production of video recordings also had its limitations. The presence of a camera exposes the observer to the others and focuses the observer's attention on what is visible through the lens potentially at the expense of significant peripheral events. To counter this effect I chose not to use a specialised video camera. Instead, I used a photographic camera that could also produce movies of acceptable quality. It drew much less attention and rarely interfered with the ongoing action because of its smaller size and, particu-

larly, because its swivelling lens allowed me to frame images without adopting typical photographer's poses. In order to complement high-focus, in-flow sequences with the contextual detail, I made sure to study and record the surroundings of each situation in visuals and in text. I also closely observed and recorded more that one sequence for each of the settings in order to allow for the alternative behaviours and reactions to be captured in my observation and documentation.

Later, I carefully studied the captured material by comparing the different types of visual and textual notes side by side, continuing with the interpretative and categorization efforts and integrating my observations and reflections into detailed textual notes. I have subsequently rewritten these notes multiple times gradually integrating them into illustrated hermeneutical narratives that informed my literature research and served as examples demonstrating my theoretical points.

In working with subtle, complex and tacit forms of knowing characteristic to human habitation, utilisation of multiple complementary material types proved very useful. In the *Klütterkammer* case-study, I employed the textual notes, photographs, sketches and movies, not only as the means of recording events and locations or illustrating the reader-oriented narratives appearing in this thesis, but also as complementary modes of vision that could sustain unique ways of knowing. The understanding of photographing, filming or drawing as the means of vision and thinking has precedents, for example in the notion of drawing as a way to "study"[1] visually complex phenomena (also, cf. the utilisation of "observational drawing" as a research technique in Whiteley, 2000, ch. 2, p. 4) or in the idea of a film camera as a new type of eye in Dziga Vertov's films[2]. This active-vision approach is particularly suitable to situations were close and sustained atten-

1. The definition 10.a. of the noun "study" in *Oxford English Dictionary* (2nd ed., 1989) reads: "An artistic production executed for the sake of acquiring skill or knowledge, or to serve as a preparation for future work; a careful preliminary sketch for a work of art, or (more usually) for some detail or portion of it; an artist's pictorial record of his observation of some object, incident, or effect, or of something that occurs to his mind, intended for his own guidance in his subsequent work. Also, occas., a drawing, painting, or piece of sculpture aiming to bring out the characteristics of the object represented, as they are revealed by especially careful observation."

2. E.g., *Chelovek s Kinoapparatom* aka Man With the Movie Camera. Dir. Vertov, Dziga. VUFKU. Soviet Union. 1929 or *Kino Glaz* aka Kino-Eye. Dir. Vertov, Dziga. Soviet Union. 1924

tion is necessary but difficult to achieve because observers struggle to register and understand the multilayered and often dynamic patterns of complex phenomena. For example, by producing numerous figure drawings or still-lifes for personal, artistic research or when in formal training, generations of artists have demonstrated that drawing can serve as a useful approach to the study of human anatomy or the lighting effects. As Edwards (1999, p. 6) promises in her popular instruction-book on drawing:

> In drawing, you will delve deeply into a part of your mind too often obscured by endless details of daily life. From this experience you will develop your ability to perceive things freshly in their totality, to see underlying patterns and possibilities for new combinations. Creative solutions to problems, whether personal of professional, will be accessible through new modes of thinking and new ways of using the power of your whole brain.

In my work on the *Klütterkammer* case-study, active, engaged types of vision achieved through in-situ recording of events proved useful in all stages of research from original observations, to initial intuitions and on to the subsequent analyses and representations.

Pink (2007, pp. 2, 3) observes that early literature on visual research suffered from its scientific and realist stance that lead to the promotion of "problematically prescriptive frameworks that aim to distance, objectify and generalize, and therefore detract from the very qualities and potentials that the ambiguity and expressivity [...] of visual images offers ethnography." Working on the *Klütterkammer* case-study, I intentionally combined systematic and impressionistic approaches to the collection of representational material in order to make it simultaneously more inclusive and expressive. For example, I have used self-imposed rules to guide my photography and movie-making: I took multiple images of places using different angles, returned to locations at different times, aimed to describe topological changes of architectural geometry, sought to follow passage routes, portray surfaces of structures and changes of lighting. In parallel, I have deliberately utilised non-premeditation as a collection technique by practicing flow-of-consciousness note-writing, rapid and loose sketching, spontaneous photography and continuous, long-take movie-making.

At other times, I also allowed my intuition guide the visual recording expecting it to be interesting in subsequent reflection as an expression of my responses to the situated events.

Working with collected material helped me retain close links with the rich on-site experiences during extended periods of reflection away from the *Klütterkammer* environments. These remote reflection and analysis were particularly enabling because they allowed gradual development of meaning through negotiatory activities such as 1) repetitive reviewing of visual traces; 2) search and comparative analysis of precedents; 4) reading of academic and other accounts in support of emerging interpretations; 5) writing and preparation of images; as well as 6) design and analysis work on the other case-studies.

This thesis includes several examples drawn from the *Klütterkammer* case-study (e.g., see p. 147 et seq.). I present the more substantial of these examples as narrative sequences supported by still images. The images include sketches, location photographs and frame sequences extracted from the videos.

Together with *The Parasite*, *Klütterkammer* was unique among my case-studies because of its public setting, the large numbers of attendees and the surprising, engaging and memorable manner of its performance. Its playful and provocative character allowed me to study a place with strongly expressed performative properties. Integration of its media components with its physical structures also allowed me to analyse a place with a pronounced hybrid nature. The ideas drawn from the experience and the analysis of the *Klütterkammer* exhibition prompted me to conduct further reading and theory development. In particular, *Klütterkammer* influenced the design and development of *The Parasite* project. After the completion of *The Parasite* installation, *Klütterkammer* also afforded an opportunity to reflect on the similarities and differences between the two projects. My participatory observation of *Klütterkammer* emphasised the hybrid nature of places in the context of a provocatively-reconfigured physical location and highlighted the socially-constructed character of places and the negotiatory nature of communal place-making. My experience of *Klütterkammer* also contributed ideas on the expressive char-



Fig. 7. *The Parasite.* **A poster at the entrance to the exhibition spaces. (location photograph)**

acteristics of places and in particular on the multiplicity of possible roles for all actants.

II.4.2 Investigative designing in The Parasite case-study

It's a Parasite!: Cambridge University Moving Image Studio Pavilion (hereinafter *The Parasite*) was a multiplicious project that simultaneously existed as an architectural construction and an act of performance, an engineering project and a piece of art, an experimental research project and an act of propaganda, a disruptive social situation and a way to make friends. *The Parasite* disturbed the existing environment of a modern-art museum in Prague by introducing a newly built structure (e.g., fig. 16, p. 75 and fig. 20, p. 77) and staging an interactive, constantly regenerating, non-repeating, audio-visual field that consisted of moving images projected on surfaces and people (e.g., fig. 61, p. 207; fig. 69, p. 214; and fig. 70, p. 215) and of an expressive soundscape. A custom-written program mixed sounds and images in real time in response to human-body movement as observed by the computer-vision system. *The Parasite's* material intervention included a structure suspended in a stairwell and an audio-visual field. The suspended structure consisted of two organically shaped, topologically cylindrical surfaces consisting of geometrically unique, topological-





Fig. 8. *The Parasite*. Two principal exhibition- and event-halls adjacent to and connected by the stairwell that hosted *The Parasite* installation. <top> The main exhibition hall located at the ground level. The image shows the production and installation of first artworks. <bottom> The main performance-hall located underground. The image shows preparations for a theatrical performance. (location photographs)



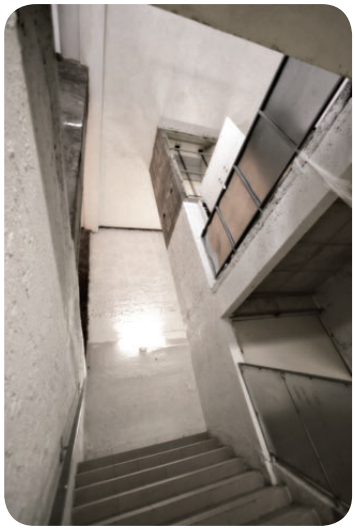


Fig. 9. *The Parasite*. The venue of the Biennale was a 1920s functionalist structure made of reinforced concrete. It suffered badly in a massive fire in the 1970s. Restorers left the lower levels of the building to look grungy and unfinished. The image shows the stairwell after painting and prior to the beginning of construction. <right> view from the side window towards the entrance of the main exhibition hall. <bottom> view from the intermediate landing up towards the lift. (location photographs)

ly cylindrical cells with cardboard walls and transparent plastic tops. We designed its structure to fit into the stairwell (fig. 9, this page) that connects the main exhibition hall with the performance area and the evening entrance to the museum. An important circulation hub, this place had a varied and busy life by the time of our arrival. The richness of this existing social setting set the scene for our interference and served as a resource of performative situations throughout the life of *The Parasite* in Veletržní palác.

In response to the curator's call to de-objectify architecture (Dernie, 2005), the design of *The Parasite* strived for a hybrid place that did not distinguish between contributions made by structures, media and



Fig. 10. *The Parasite*. Rough, unfinished textures of the stairwell. (location photograph)

human participants. It existed as an inclusive performative situation that did not lecture or promote but questioned and challenged. We imagined the pavilion as a trigger for a performative situation that could perturb the distinctions between the familiar roles of objects and people in museums and galleries.

The responsive audio-visual field included three dedicated computers running custom-written software. The computers operated an artificial-vision system able to observe the movement of the passers-by. These computers also controlled the output from the speakers and

projectors installed in the disused lift (fig. 18, p. 76 and fig. 19, p. 76). The projections included moving images of three themes: human bodies in dance, urban textures and biological cells. We assembled the images in dynamic, non-repeating, real-time collages using layered transparencies and complex transitions. The soundscape generated in real-time using samples composed for this purpose supported the visuals. The audio-visual output clustered into three moods—idle, responding and agitated— with distinct rhythms, samples, colours and volumes. The system evoked the moods in response to the amount and variation of movement in the stairwell. We achieved tight integration between audio-visual representations and the physical structure treating projections, the stairwell, the shells and the moving human bodies as equal contributors to the visual field. The innovative characteristics contributing to the seamless integration included the dissolution of the rectilinear boundary of the screen, breakage of the two-dimensional screen-surface, integration of the human bodies into the visual field and utilisation of multiple intersecting shadows as an expressive device.

The Parasite installation was constructed and exhibited during *A Second Sight, the International Biennale of Contemporary Art* in Prague that lasted from 13 June 2005 until 11 September 2005 (fig. 7, p. 68). It was erected in a building that currently houses the Czech National Gallery's Museum of Modern Art in Prague.[1] The development of the project began in 2004 and continued into 2005 with designing and production occurring in multiple locations in the UK and the Czech Republic.

The project was in active development for more than six months with six people involved in the design and fabrication processes on a regular basis and many more helping in the later stages. The on-site assembly was particularly labour-intensive with more than 70 people involved in various kinds of work for no less than 20 days. Cardboard, which we used as the primary material for the construction, is a relatively inexpensive material. However, the production costs were significant. Altogether, the structure consisted of 1560 cells, each cell

1. http://www.ngprague.cz/



Fig. 11. *The Parasite*. On the scaffolding erected to enable the suspension of the patches in the stairwell. The image shows a projection cast onto the elements of the building site and, on the foreground, a camera recording time-lapse video. (location photograph)







Fig. 12. *The Parasite*. On the foreground, the image shows the cells sorted in the order of assembly, groups of cells arranged into patches and fragments of semi-assembled patches. On the background is the technical corridor that served as one of the production-line locations. This image also shows a camera recording video footage. (location photograph)

Fig. 13. *The Parasite*. Cutting and sorting patches in the main exhibition hall. The frames extracted from time-lapse video demonstrate changes in activity, lighting and mood. (video frames)



Fig. 14. *The Parasite*. Team members assemble a patch in a technical room adjacent to the main performance space. (location photograph)



Fig. 15. *The Parasite*. Team members transport a patch from its assembly place to the stairwell through the main performance space. (location photograph)

had an average of 5.8 sides, and each side required a series of discrete assembly steps, the total amounting to tens of thousands of individual operations. Wider use of automation and rationalization of logistics could significantly reduce the demands on time and cost but the development of a cost-effective building-process would take its own time and further investment. As a very rough estimate, in a commercial environment, 10 people could complete the full structure in 70 working days at a cost of £70,000.

The project was housed and facilitated by the Digital Studio, University of Cambridge. During the project, we applied for and received

financial and other support from a variety of organisations. The project received monetary contributions through Brancusi Award, Kettle's Yard, and from the following University of Cambridge bodies: The Digital Studio; Graduate Initiative Fund, King's College; Ferris Grant, King's College; Perry Fund, Queens College and Worts Award. Materials, expert advice and other services were also provided by Automated Cutting Services, Ltd., UK; Buro Happold, UK; James Cropper, UK and Kappa Attica, UK.

The Parasite involved multiple contributing participants of different professions, interests and nationalities. A large number of people volunteered their help for the preparation of drawings, fabrication of building elements and construction. We also paid several people to help with the erection of the structure on site. Here, I mention only the members of the core team and the people who contributed original, copyrighted content. Giorgos Artopoulos and I were responsible for the idea, direction, production, architectural design, three-dimensional modelling, structural engineering, visualisation and construction. Together, we also supplied some of the source images for the interactive content. I was responsible for scripting of dynamic simulations in Maya and Rhinoceros 3D. We based the scripts for the production of Voronoi patterns on the honeycomb-generation scripts written by Andrew Kudless (then a student at the Architectural Association[1]) who collaborated with us on their further development for *The Parasite* project. Chris Rogers (then a digital arts programmer at the Junction, UK[2]) contributed to the design of interactive content and was responsible for programming the audio-visual component in MAX/MSP/Jitter[3]. Panos Demopoulos (pianist and composer) created the source material for the interactive soundscape. Iannis Artopoulos, Popi Iakovou and Nikon Microscopy contributed source images and videos for the interactive visuals.

In *The Parasite* project, my research objective was to study an architectural project as a place-making, performative situation happening in the context of existing places with their own ongoing life. I was

1. http://www.aaschool.ac.uk
2. http://www.junction.co.uk
3. http://www.cycling74.com

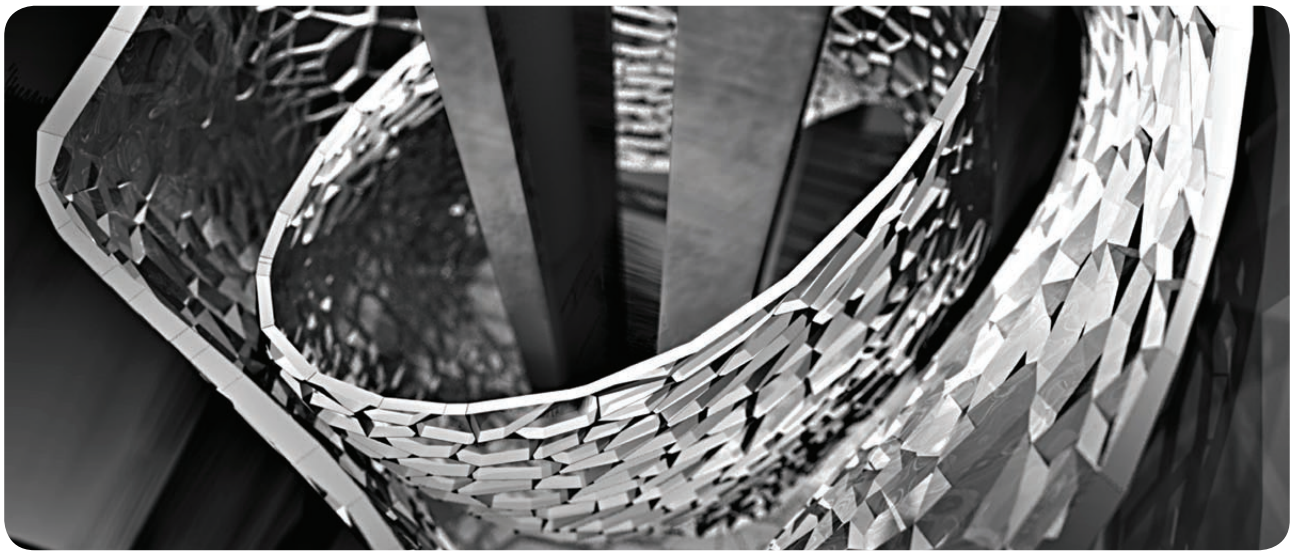


Fig. 16. *The Parasite.* **A perspective into the stairwell. (digital rendering)**

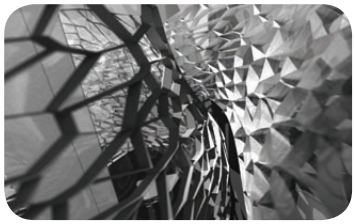
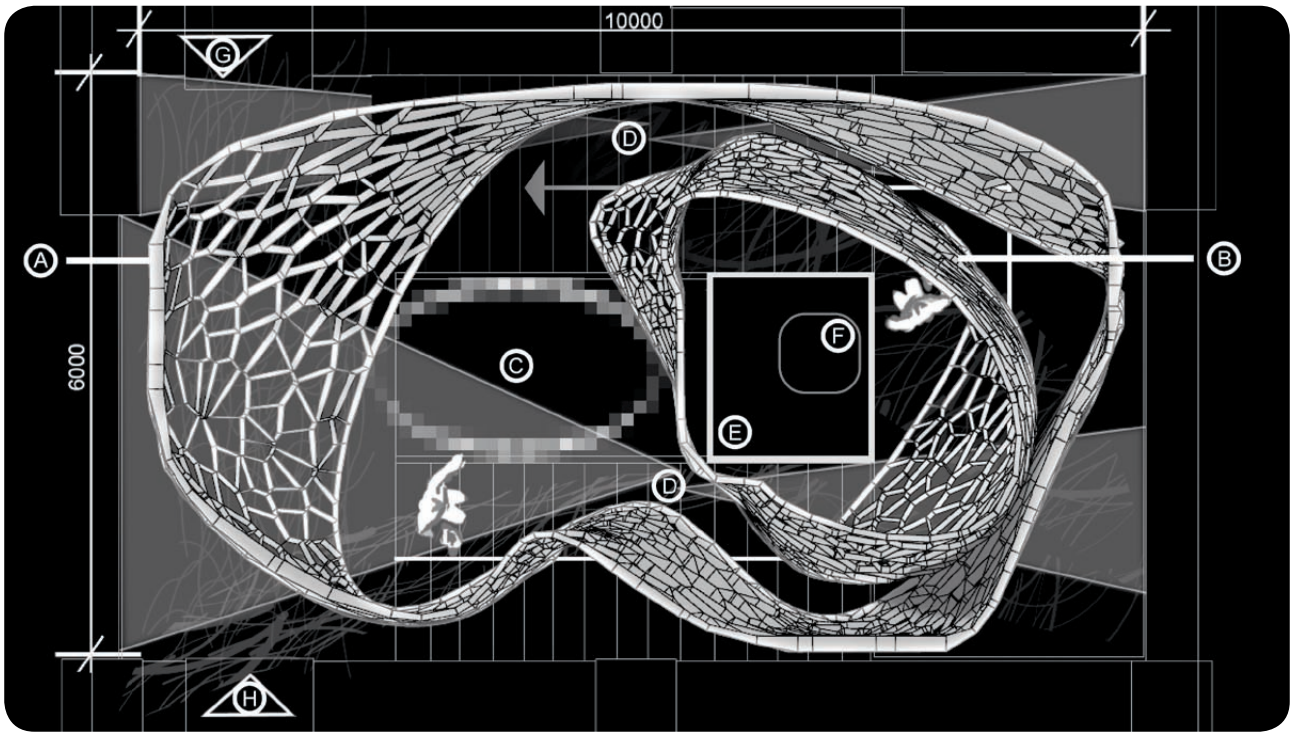


Fig. 17. *The Parasite.* **A view along the stairwell, between the two cellular shells. Used for qualitative visual evaluation, this image showed variable densities of the cells, gradations of permeability, effects of layering and degrees of skin transparency. Sequences of such images explored shell deformations, cell-parameter change, camera animation, lighting and image projection. In addition to design-move evaluation, we used this image to promote the project and attract participants. (computer rendering)**

particularly interested to observe the effects and implications of negotiated, shared place-making that I describe in later chapters as distributed creativity. In order to understand better how the emergence of places manifests itself through complex interactions with existing situations, I approached *The Parasite* project with an open attitude, characteristic of grounded and inductive approaches. Instead of imposing rigidly-specified research questions with associated, narrowly-targeted methods onto the project from the outset, I approached this case-study as an unfamiliar field in which researchers could encounter unexpected and rich phenomena worthy of observation and reflection. I felt that an open-ended mode of research was important because while my theoretical approach to places as performances promised to give atypical interpretations of places and place-making, this possibility for innovative interpretations had to be guarded against the well-established and often not consciously recognised habits of thinking formed during my professional training and previous architectural practice. While, as I have discussed in the introduction, the traditional understanding of architecture and places needs to be updated, they also remain variously effective in theorising and the practicing of architectural designing. As such they remain as influential templates in the minds of designers and I wanted to resist the conventional interpretations emerging from these templates by allowing the emergence of new concepts from provocative, techni-



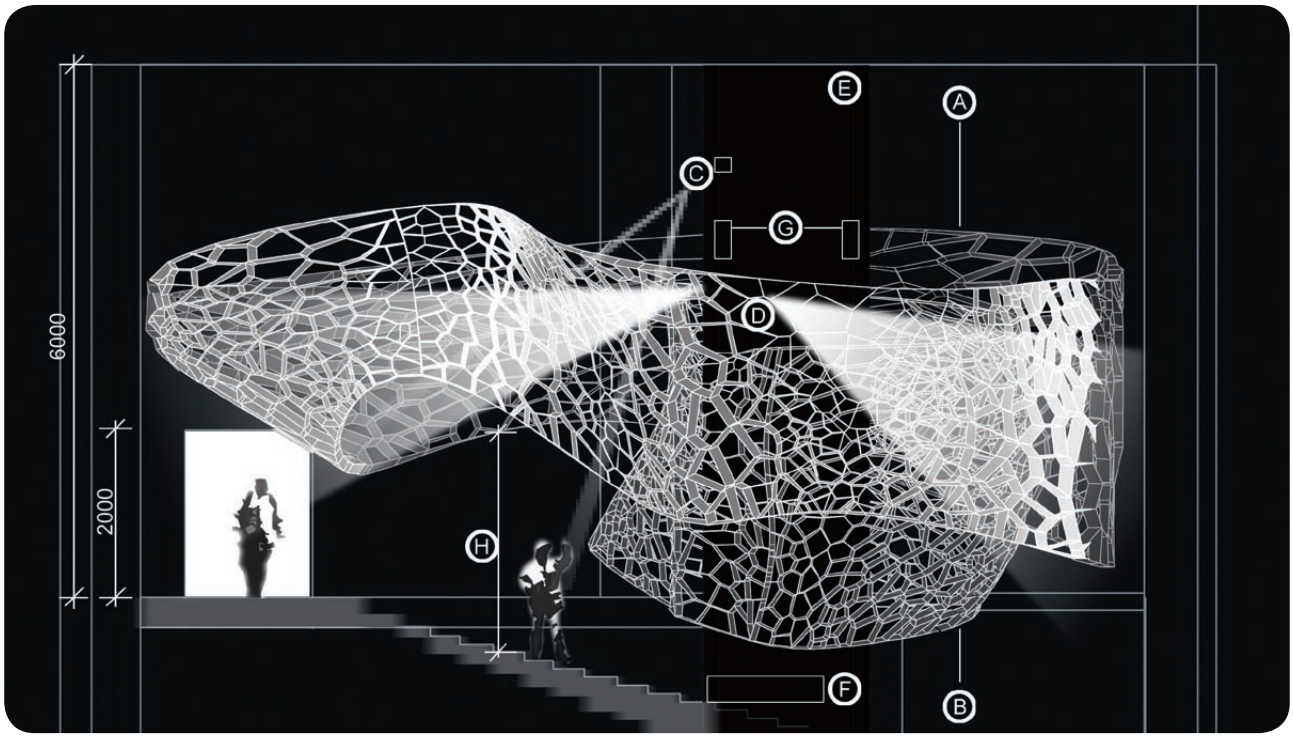


Fig. 18. *The Parasite.* **Plan view as designed. We formed the shells using dynamic curves. [A] Outer shell. [B] Inner shell. [C] Approximation of the area observed by the computer-vision system. [D] Video projections. [E] Disused lift. [F] Computers and the sound system. [G] Doors to the Main Hall. [H] Street entrance. (a digital rendering)**

Fig. 19. *The Parasite.* **Side view as designed. We achieved the flattened areas along the walls using particle-based soft bodies. The outer shell had curvature-based cell-wall width differences obvious along the top rim. The inner shell had a constant cell-wall width. [A] Outer shell. [B] Inner shell. [C] Approximate area observed by the computer-vision system. [D] Video projections. [E] Disused lift. [F] Computers and the sound system. [G] Speakers. [H] We made sure that the pedestrian passage remained unobstructed. (digital rendering)**



Fig. 20. *The Parasite*. [A] Fragment of the locally variable Voronoi-cell structure conforming to the shape of the dynamic surface. (digital rendering) *The Parasite's* final structure utilized 1560 points and an equal number of corresponding cells. [B] The outer shell in construction on site. (photograph) <1> Disused lift shaft. <2> Video projectors. (collage of photographs and three-dimensional digital illustrations)

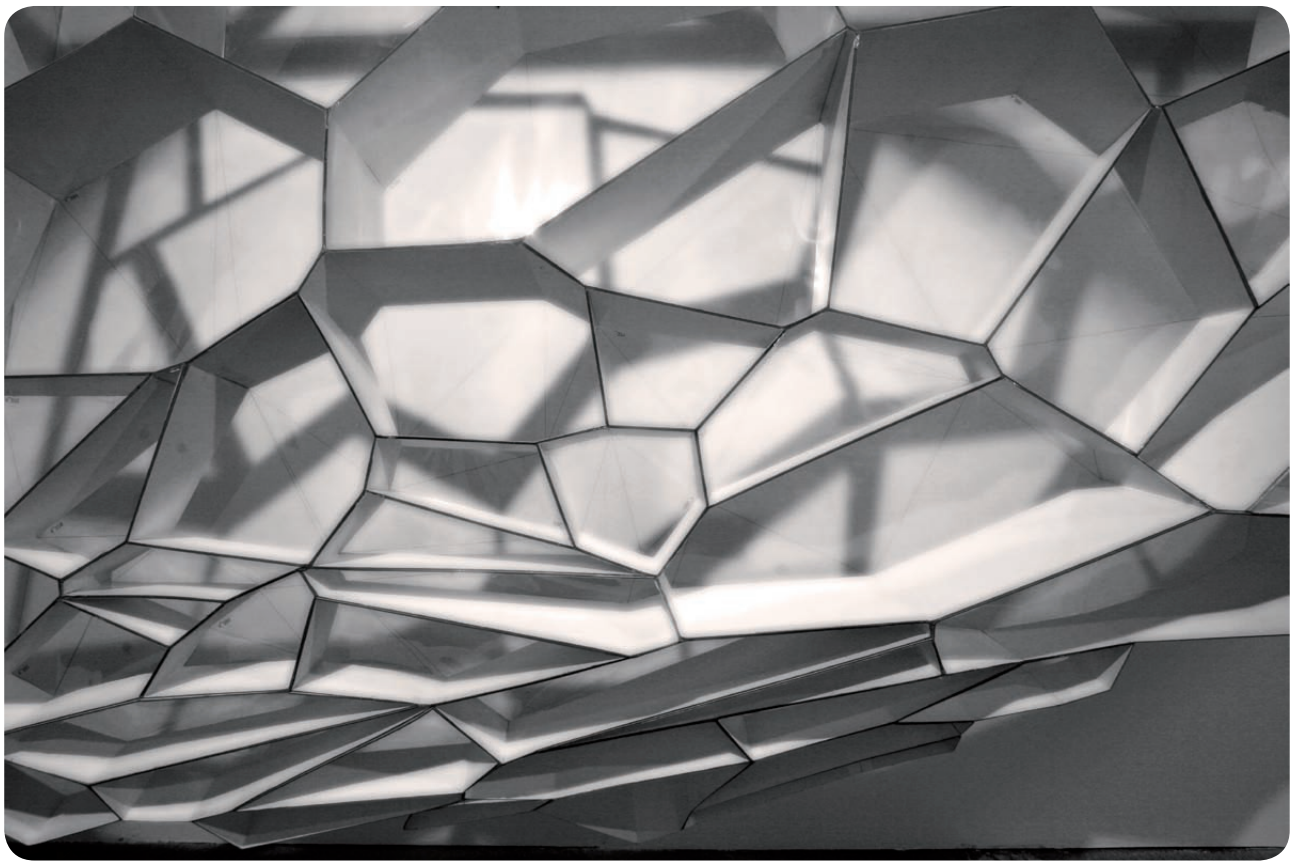


Fig. 21. *The Parasite*. A fragment showing curvature-dependent variations in density and permeability. (photograph)

cally-innovative situations that deliberately extended beyond the boundaries of already-classified architectural engagements. When I first began thinking about *The Parasite*, the performative-place approach was still incomplete and fragile as a new way of thinking about the significance of places in architecture. According to my epistemological stance, it was also an optional way of understanding places. In order to see the effects of my performative-place approach in ap-

plication to place-making, I wanted to observe how rich, in-the-field situations could inform its areas of concern. Consequently, rather than specifying hypothesis and questions, I came to the project with a loose outline of the issues that, theoretically, and from the previous experience in the case-studies, deserved particular attention. These issues focused on the processes of place-emergence and place-making including formation of boundaries between places, formulation of design goals, the nature of criteria for success in designing and the types of participation in places and place-making.

In attempting to see how my understanding of places applied to contemporary, technology-saturated situations, I further limited the space for experimentation and observation in *The Parasite* project. Specifically, I focused on the specific issues in architectural designing that my contextual review identified as relevant areas where further innovation and examples of practical utilisation of existing technical possibilities were required. These research issues included: 1) integration of digital tools in support of creative processes; 2) utilisation of complex architectural-geometry; and 3) tight integration of interactive media and built structures. These goals resided on a conceptually tactical level of research, directly engaging with the challenges of designing, fabricating and constructing architectural interventions. Designing towards these goals helped me and my collaborators to develop and test in implementation process-based design workflows and innovative computational tools as well as to suggest techniques able to generate architectural form in response to human behaviour and in unison with interactive, computer-driven media. While these research outcomes are interesting in their own right, they do not constitute the primary focus of discussion in this thesis rather serving as concrete, practical context for the consideration of place-making. I expected this context to be useful for my overarching theoretical arguments because it could provide rich material for the discussion of possible workflows able to help the emergence and utilisation of multiple meanings in preference to one dominant inscription developed by the designers. *The Parasite* project served as a useful source of research material because it exposed digital workflows, complex struc-

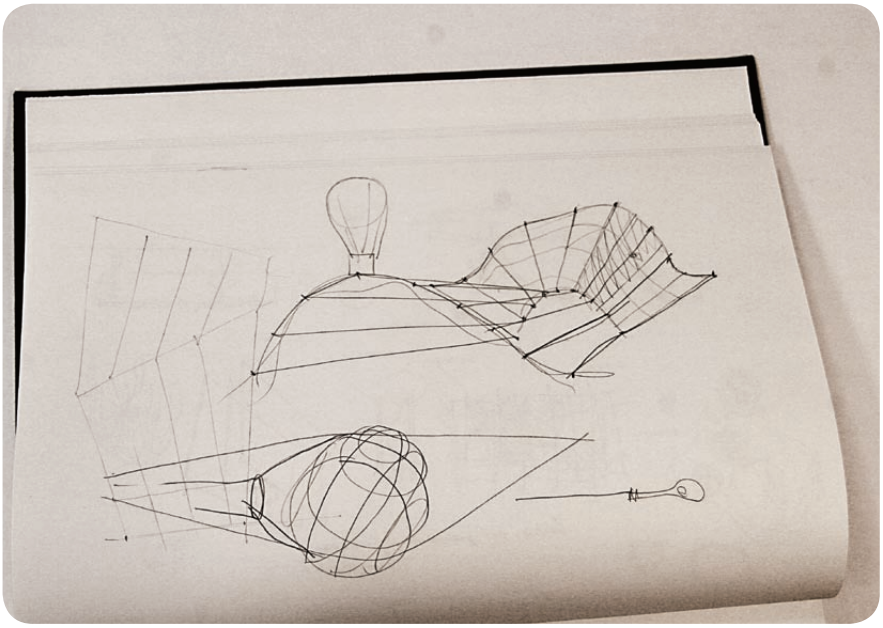


Fig. 22. *The Parasite*. A sketch exposing a sample of thought-experimentation with various structures. (paper sketch)

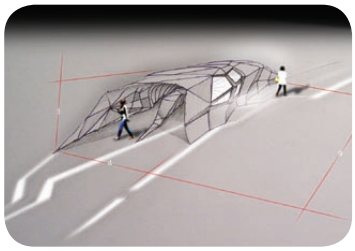
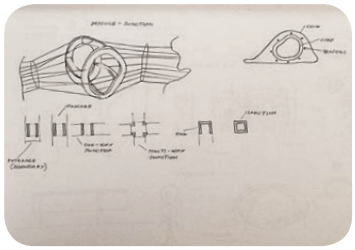


Fig. 23. *The Parasite*. An early sketch produced to communicate a possible direction of designing to the curator, the organiser and other interested parties. (mixed-media sketch)





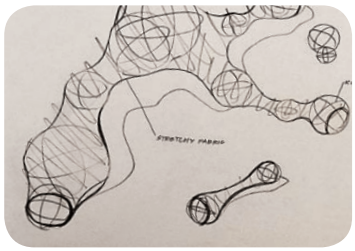


Fig. 24. *The Parasite*. Design development sketches showing alternative ideas. (paper sketches)

tures and integrated multimedia to a broad range of participants necessitating practical innovation and informing reflection on designing as shared, contingent and continuous place-making. It achieved this exposure by posing difficult technical challenges, evoking unusual collaborations and staging spectacular performances able to generate new social encounters, emotions and communications.

The Parasite case-study utilised techniques of investigative designing and participant-observation integrated into a unified approach to research. Both of these method clusters allow researchers to assume insiders' positions in relationship to the places under study. This capacity of investigative designing and participant-observation were particularly important in *The Parasite* project because I intended to collect research material and conduct analysis as close to the action as practically possible in an effort to resist the momentum of conventional design-narratives and ensuing effects of selective remembering. While this insider's position does not give access to true or privileged understandings of places or situations, it helps to integrate intimate impressions and analytical work into theoretically-informed accounts grounded in richly detailed, shared experiences. In *The Parasite* project, participant observation (as is common for the ethnographic-style fieldwork (e.g., cf. El Guindi, 2004, p. 217)) consisted of long-term, in-the-action gathering of material interspersed with recurring ana-

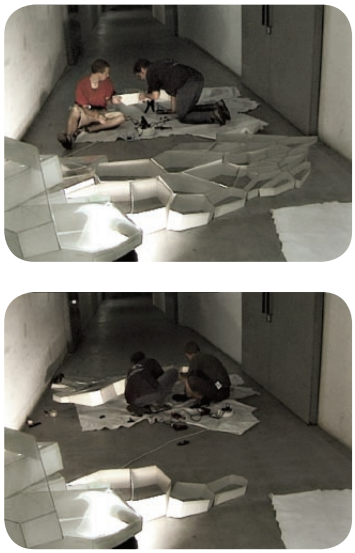


Fig. 25. *The Parasite.* **Frames from a time-lapse video showing the emergence of structure. Top right shows a patch arranged in the order of assembly on the foreground and the team members gluing the first cells on the patch on the background. Second and third images on the left show the patches transferred from the foreground to the background and the bottom right image shows the ready patch on the background. (video frames)**

lytical efforts. This work of observation and analysis culminated in an interpretation of the field that, while necessarily not complete, was adequate in its capability to illuminate my research concerns and inform my overarching theoretical arguments.

Wolcott (2005, p.58) suggests that

> [T]he essence of fieldwork is revealed by intent [...]. [F]ieldwork is a form of inquiry in which one is immersed personally in the ongoing social activi-

> ties of some individual or group for the purposes of research. Fieldwork is characterized by personal involvement to achieve a level of understanding that will be shared with others.

Compatibly with this definition, my observational work was directed towards an understanding of socially meaningful situations. However, unlike much of ethnographic work, my primary interest was not only in the study of already established situations but also in the issues, possibilities, concerns and patterns occurring during the emergence of new places. Therefore, I reasoned that it would be beneficial to have access not only to the external effects of other people's designing but also to the circumstances, experiences, reasons and emotions of architects acting as imaginative initiators of place-making. Consequently, I chose to engage in first-hand investigative-designing understood, for the purposes of research, as a form of "personal involvement" Wolcott (2005, p.58) with the field. The primary benefits of the investigative designing in *The Parasite* project emerged through its parallel employment with participant observation. Investigative designing provoked the existing social circumstances of places with an architectural intrusion while the techniques of participant observation helped to register and reflect on the ensuing consequences.

While I was one of the two primary designers, the project was a broadly collaborative engagement that had to satisfy a range of expectations and criteria shared by other architectural projects. Like these other projects, it had to involve many distinct groups of actants such as organisers, curators, visitors, other designers, engineers, marketing people, sponsors, fabricators, builders and security workers. Therefore, in spite of my influential and direct engagement with the field in the role of a leading expert (in itself a collection of multiple guises such as those of an artist, an architect and a researcher), I reasoned that the project was capable of giving a broad insight into the processes of place-making also common to other architectural projects. In addition to the ability to observe existing situations, by actively shaping the outcomes of designing on *The Parasite* project, I could also see how social fields and discourses reacted to the architectural decisions. Thus, in *The Parasite* project, designing served as a way to probe and



Fig. 26. *The Parasite*. Frames from a time-lapse video showing the sorting procedures during which all cells were arrange according to their numbering on the floor of the amphitheatre that was accessible as an exhibition space during the day and hosted theatrical performances in the evenings. (video frames)

provoke situations in order to elucidate characteristics of places.

The Parasite project emerged in response to the invitation to take part in the Performative Space section of the International Biennale of Contemporary Arts in Prague. When I first heard of this invitation, I immediately felt interested because it offered a possibility that was both relevant to the overarching theme of my research and distinct from my other case-studies. The opportunity seemed appropriate be-

cause the theme of Performative Space was closely aligned with the topic of my thesis and because the curator of the relevant exhibition section appeared open to experimentation. The project promised to provide opportunities for engagement with settings and challenges complementary to my other case-studies. As a major international event capable of attracting a large and versatile audience, the Biennale was interesting as a complex social setting. As a technical challenge it had scope for innovative approaches to designing and construction.

I entered the project intending to experiment with the in-practice utilisation of place-making concerns that my previous work, case-study research and literature review established as significant.

After an opportunistic initiation, the project went through a recognisable pattern of designerly undertakings. We first approached the opportunity by generating speculative design moves that probed the potential design-space and highlighted interesting issues. On the basis of these preliminary design proposals we engaged in communication with other stakeholders campaigning for recognition of the project, participation and financial support. Subsequently, we created detailed design solutions in the process generating multiple variations. This stage required extensive research and development of innovative approaches to designing, form generation, information management and representation. Having identified a promising design variant, we have arranged for the fabrication of building components, for the production of audio-visual content and for the development of the software required to stage an interactive installation. Three weeks before the opening we drove to Prague from Cambridge collecting pre-fabricated building elements on the way. In Prague, we began construction that continued for about two weeks after the official opening and as such was exposed to the visitors.

The research on the project generated a large number of sketches, digital drawings, three-dimensional physical and digital models, code snippets, photographs, movies and textual notes. This material included both the traces of the design process and the records about the designing. Additionally, as in the *Klütterkammer* case-study de-

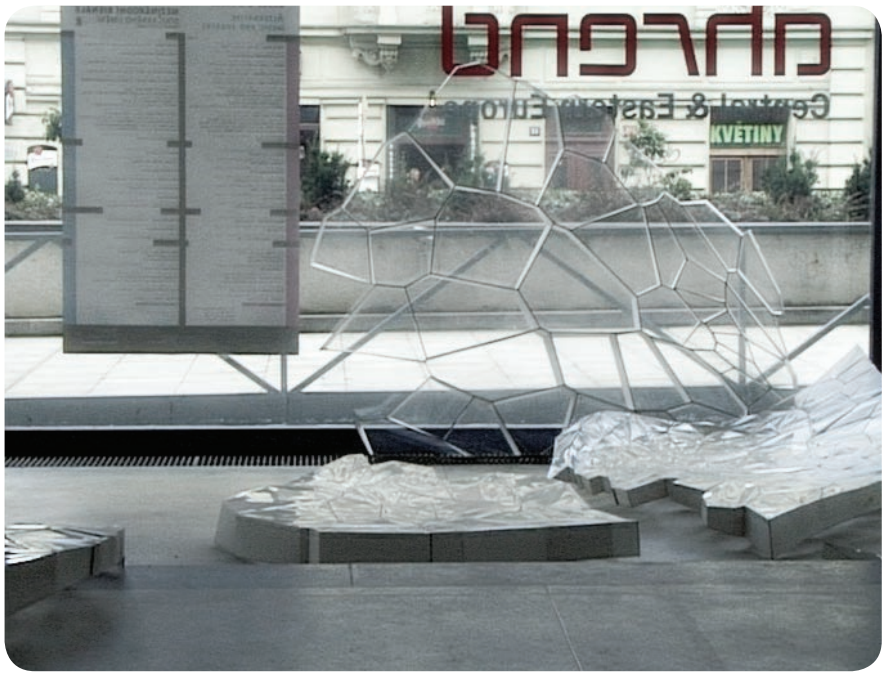
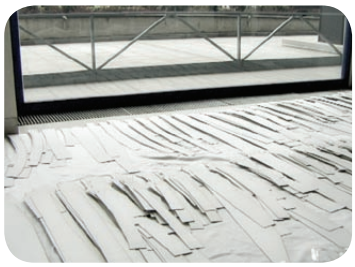


Fig. 27. *The Parasite.* <right> Frames from a time-lapse video showing the contrasting light and mood in the entrance hall adjacent to *The Parasite's* stairwell. (video frames)







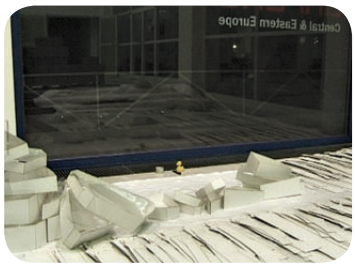




Fig. 28. *The Parasite.* <above> Frames from a time-lapse video showing the gradual changes in lighting, the sorted arrangement of cell-wall cutouts prepared for assembly and assembled cells-walls with corresponding plastic skins. Occupying the location next to the main glazed wall, this production line existed as a public performance of making. (video frames)

scribed above, I used sketches, textual notes, photographs and video as means of observation and reflection on the social situations caused or influenced by the project. During my subsequent reflection and analysis, the collection of these various types of material served as a representative record of the place-making effort as seen and experienced by the designers. Some of these materials, particularly the design-development traces, were produced in collaboration with Gior-



Fig. 29. *The Parasite.* **Frames from a video showing a passage through the lower part of the stairwell and into an exhibition hall. (video frames)**

gos Artopoulos and, as such, influenced by his input. Certain types of recordings, for example photographs, were produced as coordinated but largely independent records. The relative independence of the photographic efforts produced two accounts with complementary differences in focus and interpretation. During our frequent project-progress discussions we reviewed our recordings, discussing the sources of differences and co-ordinating further efforts. I found that this dialogical recording-when-making was helpful in reflection and suggestive in theory-construction. The multiplicity of inter-personal vision found a further expression in the photographic records when we added additional images taken by other participants that often emphasised events or details that had escaped our attention or that we did not witness directly.

I used this material in reflection and analysis during the project and after its completion. As in the *Klütterkammer*, co-presence of multiple types of material helped me to consider the phenomena under study from multiple, complementary viewpoints. Hand-drawn sketches (e.g., see fig. 22, p. 79, fig. 23, p. 79, fig. 24, p. 79) were able to illustrate the development of ideas and marked significant moments in the design and development processes. For example, these documents confirmed that utilisation of digital tools in the very early stages of designing does not hinder speculative exploration of multiple, parallel ideas but, instead, supports this process. The use of such tools can encourage designers to focus on processual characteristics that see objects as effects of performances and can emphasise concepts, masses, surfaces and details as members of interconnected assemblies rather than as stylistic or decorative gestures. It was particularly interesting to review the design development by considering hand-drawn production sketches in parallel with numerous digital models produced for the project. Three-dimensional digital models incorporating procedural setups, animations, dynamic simulations, automated routines, custom content-organization schemes, lighting assemblies and rendering settings encapsulated a significant proportion of design solutions and, taken together, represented the confines and the content of the design space explored in the project. Only people with



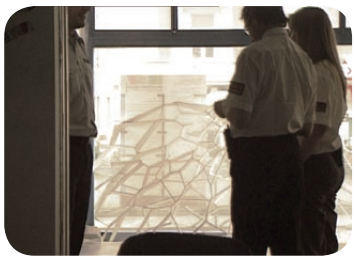
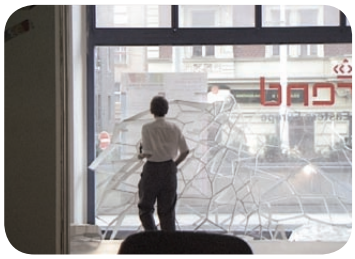




Fig.30. *The Parasite.* **Frames from a time-lapse video showing movement of people in one of the exhibition spaces. (video frames)**

specialist skills can access these traces of designing because they exist within complex software-environments inaccessible without specialised training. Moreover, during designing, we organised these digital models only minimally, to suit our own needs and usage. This avoidance of the administrative overhead in the ideation stages of designing is a common necessity because the efforts of annotation, description and categorising can easily interrupt the creative flow. In the case of programming and modelling environments, tools for organisation are typically integrated within the software that creates the content again predicating access on expert skills. Consequently, the developers of this material necessarily have to interpret it in some way before it can become accessible to others. In *The Parasite* project, there were three intermixed and fuzzy but discernible performances of interpretation. The first interpretative effort occurred during designing, the second was necessary in preparation of the technical descriptions of designing, such as those produced for academic papers describing the project (e.g., see Artopoulos et al., 2006; Roudavski et al., 2006) and the third occurred during my analysis and discussion of the performative characteristics of place-making for the purposes of this thesis. Earlier efforts of organisation and interpretation enabled my analysis of *The Parasite* as a performative place but also did not prevent returning to the original design events and materials when my developing theoretical stance required further reflection or additional detail.

Another type of material used in analysis included various administrative and support documents. For example, collections of precedents, early narratives of design logic found in slide-based presentations, correspondence with stakeholders, production schedules and budgets helped me to appreciate the contingent character of the design process and the need for evaluating design outcomes not only in terms of material objects but also as dynamic exchanges with multiple actants.

Our consistent effort towards visual documentation during *The Parasite* project included extensive use of photography and video, especially during the performative emergence of *The Parasite* in the various locations of Veletržní palác (for examples of locations see



Fig. 31. *The Parasite*. **Frames from a time-lapse video showing the assembly of a patch. (video frames)**

fig. 8, p. 69; fig. 9, p. 69; fig. 10, p. 70 and other images in this section). In order to be able to capture extended and dynamic performative situations, we utilised several patterns of continuous and time-lapse cinematography (e.g., see fig. 25, p. 80; fig. 26, p. 82; fig. 27, p. 84; fig. 28, p. 84; fig. 30, previous page; fig. 31, this page). The time-lapse techniques proved particularly useful because they could compress temporally extended events into manageable chunks. While this compression necessary distorted the original events, it also made reviewing feasible. Apart from enabling an easier access to the captured material, the time-lapse cinematography also had benefits as a way of vision and analysis. For example, it exposed gradual changes in lighting (e.g., see fig. 27, p. 84 and fig. 28, p. 84), movement (e.g., see fig. 30, previous page) and emotion by showing in quick secession how building work proceeded in different times of the day or how people moved about during different events such as openings, theatrical performances or construction work taking place in the museum. During *The Parasite* project, we used several patterns of time-lapse cinematography. These patterns fell into two groups with one recording a single frame per unit of time and the other recording series of takes separated by regular intervals in action but positioned with no gaps on the video tapes. Both types proved useful in reflection and evocative in representation. They also produced a broad variety of visually powerful, often compositionally-surprising material confirming their roles as distinct modes of vision and suggesting alternative foci for reflective attention and interpretation. Contrasts between situations are sometimes difficult to notice in the midst of action because changes accrue gradually so that contrasting states are removed from each other geometrically and/or temporally. Other places and experiences can also occur between contrasting situations obscuring the accrued changes. Non-linear access to video material, provided by contemporary editing applications, makes it easier to juxtapose and compare complex and extended in-the-field experiences. When reviewing continuous footage and video taken at regular intervals, I often could observe the behaviour or events that I was not previously aware of or did not have a chance to witness directly. The recordings could capture

actions and conversations that did not seem significant when they occurred on-site and would have remained unnoticed or forgotten without the collected video traces. The video also successfully captured the emergence of architectural structures (e.g., see fig. 25, p. 80; fig. 26, p. 82; fig. 28, p. 84; fig. 31, previous page) together with the peculiar methods of assembly pertaining to various construction challenges and the way assembly processes occupied space. The video exposed performative, dance-like characteristics of assembly processes and captured team members in revealing unselfconscious moments of labour and repose. For example, a continuous shot (see fig. 32, next page for an extracted still-frame) showing a team member working on the construction reflected the mood of the place given by the working audio-visual component of the installation in combination with micro events such as passing people, brief dialogues among participants, usage of tools, the movement of the structure suddenly threatening to fall and an observable human reaction to this sudden event, moments of rest, contemplation and uncertainty.

While our video recordings were far from comprehensive, reviewing the material often triggered memories and exposed links to past experiences or the meanings emerging from the other types of records. This catalytic and cumulative effect was particularly prominent because of my methodological decision to directly participate in the development and making of *The Parasite*. Many of these traces would appear less meaningful to external observers lacking the direct, prolonged, intellectually demanding, physically tiring and emotional experiences of the events.

Complete inclusion of the generated material into the established form of a doctoral thesis a technical impossibility. Additionally, while much of this material is meaningful for me because I know the circumstances of its generation, for the people with no close association with the project many material traces of the design development remain obscure without an accompanying textual interpretation. Moreover, the uncommented presentation of project traces can be misleading because certain stages of the design process can be more fully documented than others and because the selective documenta-



Fig.32. *The Parasite.* **A team member assembles patches working on the scaffolding installed in the stairwell. The image shows the effects produced by the audio-visual component of the installation that remained active during construction. Throughout the construction process the stairwell remained accessible to the public. (a frame extracted from a long, continuous video recording)**

tion itself constitutes a form of interpretation. This unevenness of coverage is unavoidable because some events and circumstances are easier to record than others. Similarly, some design moves naturally leave material traces because they are expressed in a recordable medium while other design acts occurring in personal reflection or conversation are more difficult to record and report. By selecting certain material instances for presentation, supporting them with metadata or textual descriptions and/or employing a strategy for a more systematic recording or collection of material in the midst of designing, researchers impose their particular and wilful approaches that result in subjective interpretations and in the modifications of the processes under study. Therefore, I made a conscious decision to include visual material only when I could explicitly support it with textual discussions. In the case of *The Parasite*, most of the visuals included in the thesis are especially prepared drawings intended to illustrate and explain particular technical, compositional and aesthetical issues. My primary target audience, architectural practitioners and researchers, are accustomed to visual communication and often can form judgements using sketches, drawings and models with greater confidence than when reading textual descriptions. The broader audience for my interdisciplinary research can also benefit from access to this visual

material because it can help to, on one hand, disambiguate terminology and, on the other, introduce concepts and solutions that have not yet became recognisable as entities in common discourse. This is particularly important in the case of unusual and innovative structures such as those utilised in *The Parasite* project because they are difficult to describe in words or by reference to existing prototypes.

In addition to the textual discussions and the supporting images included into the body of this thesis, I am including with my submission a DVD disk of a movie that includes some of the source photographs and videos assembled into an evocative interpretation of the project's progression. While the movie was intended as a visual reflection rather than a resource directly supporting the discussion in the text, its inclusion provides additional insights into the practical circumstances and the atmosphere during the project. This movie was directed and edited by Giorgos Artopoulos. He was also responsible for the tactical collection of video material on site while the strategy of this collection was our shared responsibility. I was took many of the source photographs and was responsible for 3D animations and rendering as well as for the consultative participation in directing and editing.

As a research project, *The Parasite* extended the scope of concerns typical for design, art or architecture endeavours that also intend to make new places and necessitate broad collaborations. This extended learning output was possible because from the outset I intended to utilise it as a research exercise where designing was coupled with observation, reflection and reporting. At the same time, *The Parasite* project was also unique among my research-oriented case-studies because of its artistic mandate, large scale and extended incubation period.

The Parasite project fitted with my overarching goals of encouraging the renegotiation of the concept of place as it is understood and utilised in architecture. Consequently, I made efforts towards participation in and influencing of this discourse through engagement in academic and professional public forums in parallel with the preparation of this thesis. Whenever Giorgos Artopoulos and/or I presented



Fig.33. ***The Parasite*****. The scaffolding installed in the stairwell. The team members are suspending a cellular patch. (a vertical stitch of two video frames extracted from a continuous, vertically panning shot)**

the innovative technical information and our reflections on various aspects of *The Parasite* project, we found that our presentations led to interesting discussions as well as to offers of further demonstrations, publications or interdisciplinary collaborations. The most significant events that hosted public exposures of *The Parasite* project included 1) Synthetic Landscapes: the exhibition of the 25th Annual Conference of the Association for Computer-Aided Design in Architecture (ACADIA 2006), Louisville, KY, USA; 2) 3D Event: London Technology Network, 2006, London, UK; 3) 2006 River's Edge Film Festival, Paducah, KY, USA; 4) ZeroOne San Jose: A Global Festival of Art on the Edge & the Thirteenth International Symposium of Electronic Art (ISEA 2006), Interactive City Symposium, San Jose, USA; 4) Technology

Matters, 2006 conference, Ecole Nationale Supérieure d'Architecture Paris-Malaquais, Paris, France; 5) Compendium, 2006 an exhibition at the Royal Institute of British Architects (RIBA), London, UK; and 6) Olhares de Outono, 6th International Festival of Digital Arts, 2005, Centro de Investigação em Ciências e Tecnologias das Artes (CITAR), Universidade Católica Portuguesa, Fundação para a Ciência e a Tecnologia (FCT); Porto, Portugal. We also discussed the outcomes of *The Parasite* project in several academic and design publications (Artopoulos and Roudavski, 2005, 2006a, 2006b; Artopoulos et al., 2006; Roudavski and Artopoulos, 2006; Roudavski et al., 2006). In addition, a digital rendering of the structure used in *The Parasite* won an honourable mention in a design competition for the cover of the International Journal of Architectural Computing organised and refereed by the Association for Computer-Aided Design in Architecture. I suggest that these efforts at exposing the project and its details to public, critical discussion confirm its identity as an intentional research endeavour and strengthen its claim as a source of outcomes acceptable as research to the academic and professional architectural communities.

While I have integrated the discussion of *The Parasite's* outcomes into the subsequent chapters of this thesis where they can directly relate to and support my theoretical arguments, I would like to note here that the project successfully produced complex yet buildable surfaces using a procedural design workflow. In the process, it suggested practical and reusable workflows integrating traditional architectural concerns about form and structure with the design of computational multi-media. While such integration is desirable in architecture, currently it remains an unusual goal and an even more rare achievement (cf. Eng, 2004; Imperiale, 2000; Oosterhuis, 2003). *The Parasite* project also confirmed that it was possible to use adaptive, non-periodic, cellular patterns such as Voronoi to make architectural structures and demonstrated practical, procedural techniques for design and control of complex geometries.

Additionally, during *The Parasite* project I found that we extended our architectural repertoire when we accepted performative contributions made by a wider range of participants. For example, the au-

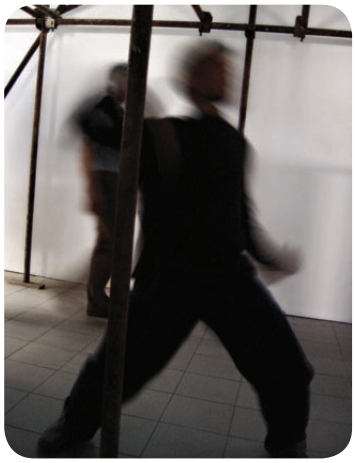






Fig.34. *The Parasite*. **Frames from a continuous video showing a visitor dancing in order to provoke a response from *The Parasite's* audio-visual system. (video frames)**

dio-visual field of the installation came to life only with the arrival of people who cast shadows, moved through the structures, assumed and shed social stances. Through their contributions, *The Parasite* gained new plastic characteristics and new, subjective but interlinked interpretations. Following the recommendations of my performative-place approach, I was able to confirm that multiple meanings of *The Parasite* emerged as a story of tensions: between the perfect completeness of the digital and the untidiness of the physical, between ambitious concepts and practical constraints, between goals seen as the desire to make objects and goals seen as playful explorations. An acknowledgement of the contradictory and multiplicious character of

architectural interventions, as suggested by my experience with *The Parasite* project, pointed to the need to extend the architectural repertoire with the tools and techniques that can support design in dynamically changing situations with multiple disagreeing stakeholders. Within the fuzzy confines of its conceptual and social spaces, *The Parasite* project succeeded in eroding the conventional boundaries between the digital and the physical. In designing and constructing *The Parasite*, we were able to use a variety of experimental, open-ended, computer-driven design processes to guide imagination and utilise relationships typically excluded from the architectural domain.

During *The Parasite* case-study, my direct involvement with designing helped to expose conventional concepts such as those of author, user, value, outcome and audience as unstable and fuzzy. Reflection and discussion derived from this direct involvement helped me to formulate ideas that I could subsequently reconsider in relationship to my other case-studies. This further consideration helped to discard a number of notions as unsustainable within the scope of the thesis and deepen my understanding of other concepts through the considerations of their practical, situated reincarnations.

II.5 PARTICIPANT OBSERVATION AND INVESTIGATIVE DESIGNING AS INSIGHTFUL APPROACHES TO THE STUDY OF CREATIVE PLACE-MAKING

Objectivist approaches to research have considerable momentum in architecture even though the objectivist assumptions are often unacknowledged in the work of practitioners and researchers. A significant proportion of existing architectural-research discourse, influenced by objectivism, prefers scientific approaches to practice-led methodologies doubting that the latter can contribute to sharable knowing or conduct rigorous studies. Simultaneously, architectural practice, largely influenced by polemical theories or preoccupied by the concerns of production, conducts its own designerly research. I suggest that utilisation of immersive methodologies such as participant observation and investigative designing can improve the construction,

sharing and retention of architectural knowing.

In support of this suggestion, this chapter has discussed how a hybrid approach combining participant observation and investigative designing can contribute to knowing in a rigorous manner, how these contributions are complementary to those attainable with alternative techniques and how they can be useful to designers. As a contribution to the ongoing discussions on the research methodologies in design disciplines, this chapter has presented an example of a coherent framework consisting of knowledge claims, methods of research engagements and criteria for rigour. It exemplified the theoretical statements of this framework by discussing two case-studies that explored practical possibilities for knowledge-making approaches able to study inhabited and emerging places as architectural phenomena.

I believe that participative, empirical methodologies utilising interpretation and reflection provide important benefits to the study of hybrid places. A participant in a place engages with other actants. By contrast, an external observer has to rely on the accounts of others or numerical data. The lack of experiential engagement prevents external observers from sharing the motivations of other participants or following the in-practice logic of designers. By taking observation and experimentation into the midst of action, participant-observation and investigative-designing methodologies help to trace the complex processes of place-making unbiased by the stories of creation that come into circulation after the completion of designing. In conditions where the direct experiences of events have faded and actants have already produced stabilised meanings, it is difficult to study places because the intricacies of development and alternative patterns of engagement can remain hidden.

Self-reflective practice-based enquiry bypasses the problem of representing the Other. In principle, many agree that researchers are also subjects and the subjects are co-researchers. Yet in practice, traditional research-methodologies instruct researchers how to study others. In placing the researcher at the centre of action, investigative designing extends the efforts of action-based and participatory methodologies. I acknowledge that without a rigorous methodology, the know-

ing produced by practitioner-researchers reflecting on their own work can be idiosyncratic to the degree of being inaccessible to others. However, I also argue that consistent, organised and self-critical reflection can generate insights unattainable in any other way. Working on my case-studies, I was consistently able to gain revealing insights into the actions I undertook as a practitioner by adopting a simultaneous role of a researcher.

In addition to establishing a foundation for the rest of this thesis, the methodological discussion in this chapter also demonstrates methodological reflexivity fulfilling the conditions stipulated by the emerging understanding of doctoral research not only as an effort intended to produce a contribution to knowing but also—or even primarily—as an exercise in training of a future professional-researcher (for the discussions of this interpretation, see Durling, 2002; Durling and Niedderer, 2007; Newbury, 2003).

The discussion presented in this chapter suggests that practice-based methodologies can uniquely contribute to an understanding of creative design-process in place-making and provide a re-conceptualized foundation for the study of places and place-making introduced in the subsequent text.

III

PERFORMATIVE-PLACE APPROACH AND MAKING OF PLACES

In the Participant Observation and Investigative designing chapter, I discussed my methodological approach and introduced the case-studies.

This chapter begins to apply this methodology in the discussion on place that posits the following research questions:

- What are places? How can the understanding of place accommodate recent technological developments and changes in social practices that affect and reshape phenomenal, experiential and lived environments?
- Can architects make or design places? What are the general requirements for a suitable creative process?

III.1 WHAT PLACES ARE NOT

In this section, I distinguish my understanding of place from several common interpretations.

III.1.1 Place and region

I do not conceptualise place in terms of spatially located regions or containers with definable boundaries. Regions are not natural to places, instead, they are inventions that are comparatively recent (Curry, 1999, p. 6) and optional to the understanding of place. Rather than bounded regions, I see places as intersections of traffic, ports of call

or sites of transactions. Wherever boundaries exist, they are more like filters than walls and their permeability is different for different actants. Many places constrain access by allowing or rejecting entry, limiting the time of stay, restricting mobility or banning possession of certain items.

For example, such a place with fuzzy boundaries served as a host for the *Warning for the Curious* project. We staged the *Warning for the Curious* game in King's College, Cambridge initially imagining that it would stay within enclosed and guarded college grounds. However, it quickly became apparent that meaningful forms of King's College never coincided with its cartographic boundaries and instead functioned as a cluster of heterogeneous involvements. Experientially and symbolically, the college extended into the city and far beyond. For example, tourists walking along the river, on the ground that, according to official plans and brochures, does not belong to the college, looked into the college grounds, admired their beauty and felt curious to explore further. Images on souvenirs and postcards were in the shops, cafes, London-bound trains and various Internet sites. Posters of concerts in the King's Chapel hang on the city walls. Television featured the college in regular Christmas broadcasts traditional for all-family viewing as far away as Australia. Different types of access imposed different constraints on people coming into an involvement with the college. Boundaries that limited touching, walking, seeing and hearing did not have coincidental geometry or identical visibility. Experiential paths did not follow geometrically optimal routes. For example, hearing a request to enter, the porter at the Back Gate directed tourists towards the Chapel Gate that they could reach only by making an extended loop through the parklands and the city. Groups of people had different rights of access to locations in the college. Within the college, tourists could not enter the Library or Dining Hall. They also could not walk on the grass. Students could enter any of the gates, could use the Library and the Dining Hall but also had to keep off the grass. Fellows could walk on the grass but, unless invited, could not enter the student rooms. College statutes specified some of these rules, college administration made others according to

need, still other rules or customs emerged as informal agreements or undiscussed habits. Rights of access changed with the circumstances. Imposing buildings including the famous Chapel seemed inviting and many attempted entering through the Back Gate. Sometimes the Gate was open to everyone. At other times, the porters refused entry altogether or directed tourists to take another route. People's behaviour changed with circumstances. The same people could be tourists, conference or concert attendees, students and fellows during different visits and their rights, needs and interests changed accordingly. In the design of the *Warning for the Curious*, we could not take any existing cartography for granted and instead had to position events in relationship to the multiple, intricate and subjective pathways treaded by many diverse actants.

III.1.2 Place and space

I do not think that places are spaces, are in space or that they depend on fixed locations in space. This is contrary to an influential and widespread opinion expressed, for example, in Cresswell's (2004, p. 12) statement that "place, at a basic level, is space invested with meaning [...]". Even though the advent of the networked, digital technologies made non-spatiality and fluidity of places much more common, predigital places also had these characteristics. Independence of place from space appears counterintuitive because it contradicts habitual thinking and the currently taught ideas. However, people's lived experience confirms that such independence is a familiar phenomenon. Places can sustain stable forms recognisable by large and varied social groups. Yet, the elements of places can be mobile or unstable and human participants of places can disagree on their locations, boundaries, compositions or meanings.

In the contemporary world, characterised by rapidly increasing mobility and dislocation, lessons from traditional cultures experienced in nomadic lifestyles and successful at sustaining places prove a useful illustration. For example, Northern Siberian peoples such as Chuckchi, Nenets, Eveny or Evenki use mobile tents compatible with their nomadic lifestyle. Yet, their homes are significant and stable

places that sustain families over many generations, retain personal memories, propagate traditional ways of life and feature distinct visual styles. Coming back from a journey through the landscape, their hunters return home, even though they return to different locations depending on the seasons and other circumstances. Relocations can be very frequent; for example, Nenets dismantle and reconstruct their chums about 50 times each year. In these circumstances, the home assembles on demand through contributions of the surrounding landscape that provides essential affordances for habitation, the presence of the inhabitable structure as well as the performances of people and their animals. Importantly, the most significant act that makes a new site home is the lighting of a fire and ritual of feeding its spirit. For example, Vitebsky (2005, p. 85) reports that "[f]eeding the fire [by tossing a mugful of vodka into the stove] is the most important act upon arriving at a new site. When you do this, you are making contact with the place that is accepting you as its guest. [...] It is this offering, not the pitching of a tent, which creates an inhabitable space for you in the landscape."

Another example is the dissociation between place and space in *Star Wars Galaxies*. The world of *Star Wars Galaxies* is a world of places. It consist of virtual planets, cities and landscapes that house complex and dynamic social life that produces trade, communities, friendships and even marriages. Yet, it is impossible to associate these places with particular, fixed spaces. Actants that produce places in *Star Wars Galaxies*—players, developers, system administrators, game servers, client computers, communication networks, fan websites, user forums and support portals all have associations with geographical locations. However, it is impossible to establish an exclusive interdependence between any of the places experienced by the players and any one of these geographic locations.

Place that does not depend on space can account for multi-presence. Contrary to what common sense or geometry suggest, it is possible to be in several places at once. The phenomenon of multi-presence is not new but recently, the impact of information and communication technologies multiplied its utilisation and emphasized its signif-

icance. As I participate in an online community, such as *Star Wars Galaxies*, I also sit at my computer in Cambridge, England, am active in a number of mailing lists, follow several user forums and intrude into the room of my friend in Dublin with a recorded voice-message. The possibility of multi-presence arises from the understanding of place as a performed rhizome of actants whose spatial, geometric and locational attributes are social constructs. Multi-presence appears paradoxical only if places reside in Euclidean space whose laws do not permit two entities to occupy the same location simultaneously. If place does not depend on space, the paradox dissolves.

In a reverse effect to multi-presence, multiple actants can gather from multiple variously remote locations to perform a shared place, a distributed locality. Materials, equipment, technologies and people performing one place always extend into other places. Following these links helps to understand how places emerge and live. Analogously, Latour (2005, p. 200) insisted that "no interaction is what could be called isotopic. What is acting at the same moment in any place is coming from many other places, many distant materials, and many faraway actors." Among others, Cronon (1991), Hutchins (1995) or Law (2002) discuss examples of the distributed nature of situations and perceptions. This distributed character of localities is particularly evident in places enabled by digital technologies. For example, many remote servers communicate via the Internet to enable the places of *Star Wars Galaxies*. The character of a place in *Star Wars Galaxies* depends on the characteristics of connection, the capabilities of the client computer and other circumstances such as restrictions on the play-time imposed, for example, by the need to wake up for work tomorrow or by strict parents. Every time a person enters a *Star Wars Galaxies* world, many physically remote actants have to combine efforts to make it possible. Similarly, mobile-telephone masts and remote traffic-managing hardware of multiple mobile-phone network providers contributed to the place-performance of *A Warning for the Curious*. In the case of *Virtual West Cambridge*, the virtual/physical encounters occurring, for example, in the prestigious setting of Sir Norman Foster's Law Faculty building depended on computers, pro-

jectors, cables, furniture and people transferring from multiple locations to assemble temporarily into one place. For the duration of the exhibition, remote building sites and architectural projects linked to the Law Faculty to create an atmosphere conducive for exploration and discussion.

I suggest that architectural design should look at the character and number of relationships rather than at the logistics dictated by geometric distances. Geometric distance is not in a direct dependency with the capacity to gain access. This is particularly noticeable in places where communication technologies allow remote, simultaneous and asynchronous access. However, the same is characteristic of all places. People often think of distances in terms of time rather than length. The experiential length of a city street varies with direction or circumstances. *Star Wars Galaxies* is again a useful example. There, areas around "shuttleports" and "starports" attract high numbers of traders and other players. Valuable because they make it easier to actuate the links to remote destinations, these locations bring together many players, making it easier to establish and perform commercial, combative, instructional and other relationships. The design of places like *Star Wars Galaxies* is fundamentally a task of arranging relationships rather than building three-dimensional geometry or rendering realistic scenes. Designers have to participate in collaborative community-relationships discussing, advertising, bribing and staging public events in order to balance the world and keep the players motivated. I argue that architectural design similarly needs to develop methodologies and techniques that focus on making, evaluating and sustaining meaningful relationships. Such relationships are the defining characteristic of many existing environments, especially those that develop over time such as urban neighbourhoods. However, the proliferation of digital technologies makes the need for the focused attention on such relationship more acute because while sustaining significant social-practices, these technologies often distribute and hide the material components of places and thus erode the organisational roles they traditionally fulfilled in the architectural palette.

III.1.3 Place and identity

Places are not the sources of static, unifying identities—they are full of internal conflicts. This assertion contradicts a common understanding that uses the notion of identity to define places and understand their authenticity. For example, Augé (1995, pp. 77, 78) argues that "[i]f a place can be defined as relational, historical and concerned with identity; then a space which cannot be defined as relational, or historical, or concerned with identity will be a non-place." I argue that no place sustains only one, privileged identity and that it is misleading to speak about places in terms of authenticity. Similarly, in an influential discussion of a city neighbourhood, May (1996, p. 210) concluded that "we may need to recognize the multiple place identities people now draw upon and consider more carefully the ways in which such identities are constructed." Different people have different visions of boundaries, rootedness, traditions and relationships in places. Consequently, places can sustain many simultaneous and contradictory identities. Openness about place identities is essential in the contemporary situation of high mobility encouraged by the impact of digital technologies.

Place as a source of unique identity is a compromised idea. The proliferation of romantic and rural images in the discourse on place has led feminist, Marxist and post-structuralist authors to stay away from place as a concept. Harvey (1996) exemplified these concerns when he argued that the role of place increases in the conditions of globalisation and "time-space compression". Discussing place as a form of fixed capital, he suggested that struggles to maintain the identity of places lead to exclusionary behaviour and bigotry. He saw place as reactionary and retrograde because tight and immobile connections between people and identity-giving places implied existence of insiders and outsiders, the privileged and the repressed.

The dissociation of place from the dependence on an authentic tradition has allowed me to recognise as places many situations that architects typically do not consider. Recognised as places, many of these situations fall within the remit of architectural design and can benefit from the expertise of professional architects. Romantics

do not acknowledge as places many situations involving contemporary technologies including many of those exemplified in my case-studies. This common rejection of emerging place-making practices as frivolous or even harmful is exclusionary and judgmental toward emerging social practices that are meaningful and significant to their participants. For example, media and popular opinion often dismiss videogames as superficial, mindless or even harmful entertainment. I suggest that an inclusive understanding of place can lead to a more rigorous and open-minded re-evaluation of the emerging phenomena. This re-evaluation can create the foundation for appreciation, acceptance and participation that are among the prerequisites for any useful design-contribution. An acceptance of new hybrid places into academic and professional discourses can provide better theoretical tools and result in more flexible, open and rigorous design techniques.

III.1.4 Place and community

Equation of place with community is also misleading. Communities often spanned multiple geographical locations in the past. Now, when many communities exist online or with the help of communication technologies, the distributed character of communities has become especially common. Even when a community strongly associates with one place or location, it usually includes groups that relate differently to their context. More commonly, places extend into the world; they are inherently "global" entities. As Massey (1994a, pp. 154, 155) writes,

> Instead then, of thinking of places as areas with boundaries around, they can be imagined as articulated moments in networks of social relations and understandings, but where a larger proportion of those relations, experiences and understandings are constructed on a far larger scale than what we happen to define for that moment as the place itself, whether that be a street, or a region or even a continent. And this in turn allows a sense of place which is extroverted, which includes a consciousness of its links with the wider world, which integrates in a positive way the global and the local.

Places do not derive identity from an internalised history shared by a dominant community. Instead, they serve as gathering sites tempo-

rarily bringing actants into relationships. An understanding of places as unstable and open helps to dissipate concerns about their reactionary and introverted nature such as those expressed by Harvey (Harvey, 1990, 1996) who worried that capitalist hegemony over space and time resulted in politics of æstheticized spatiality and warned (Harvey, 1990, p. 303) that

> [t]he [...] dilemmas of socialist or working-class movements in the face of a universalizing capitalism are shared by other oppositional groups—racial minorities, colonized peoples, women, etc.—who are relatively empowered to organize in place but disempowered when it comes to organizing over space. In clinging, often of necessity, to a place-bound identity, however, such oppositional movements become a part of the very fragmentation which a mobile capitalism and flexible accumulation can feed upon. 'Regional resistances', the struggle for local autonomy, place-bound organization, may be excellent bases for political action, but they cannot bear the burden of radical historical change alone.

Among my case-studies, *Star Wars Galaxies* provides the richest illustration of how places can support multiple communities. *Star Wars Galaxies* is an assembly of places that bring to life, host and express multiple communities with diverse goals, lifestyles, commitments and resources. Some of the participating communities subscribe to the official mythology as set out by the Star Wars literary and cinematic narratives. Guilds are an example of such communities. Supported by the mechanics of *Star Wars Galaxies*, they work towards in-world goals inscribed by the designers. However, players also organise into trading partnerships selling virtual items outside of *Star Wars Galaxies*. *Star Wars Galaxies*' owners consider this practice illegal. Yet, it sustains thriving communities and for many participants defines the dominant meaning and the primary way of engagement with *Star Wars Galaxies*. Multiple websites that catalogue in-world items, quests and challenges reflect the existence of other types of communities. These collaborative websites provide exhaustive information on the *Star Wars Galaxies* world. Communities of players actively maintain them to keep up with the constantly changing places of *Star Wars Galaxies*. *Star Wars Galaxies* also sustain more ephemeral communities that gather for exploration, warfare and many types of

grinding for "experience points".[1] Such communities emerge around starports, player-built cities, cantinas and bars. They afford and prescribe various types of participation that differ in rewards, length, frequency, required skills and resources.

III.1.5 Place and home

I do not equate place with home. Geographers such as Tuan (1977, 1980, 1984), Relph (1976) and Seamon (1979) used home as a metaphor for place. For example, Tuan (1977, p. 3) writes that "[p]lace is security, space is freedom: we are attached to the one and long for the other. There is no place like home." Further on, (p. 149) he states that "[h]uman groups nearly everywhere tend to regard their own homeland as the center of the world. A people who believe they are at the center claim, implicitly, the ineluctable worth of their location." Similarly, for Relph (1976, p. 20), home is "the central reference point in human existence."

Such contributions own their phenomenological roots to the work of continental philosophers such as Heidegger (1962) and Bachelard (1994). "Within recent architectural theory, architecture as 'dwelling' has become something of a dominant paradigm, amid calls for regionalist architecture and celebration of the concept of genius loci." (Leach, 2002b, p. 88) However, together with the useful and influential tools for resisting simplifications of objectivism, Heidegger's phenomenology brings limitations and problems. Heidegger's well-known nostalgic example of a Black Forest farmhouse (Heidegger, 1971, p. 143–162) describes as home an imagined structure produced for and by an imagined dwelling of imagined and idealised peasants. His attitude to technology suffers from an unjustifiable romantic idealism (e.g., cf. Ihde, 1993, pp. 103–116) and (p. 108) "negativity which pervades the Heideggerian corpus and which blinds the analysis both to a possible appreciation of human-technology relations other than embodiment ones and to the features which, in fact, unite modern technologies to traditional ones." This romantic view is also incompatible with

1. "Experience points" or are a measure of virtual-character strength in *Star Wars Galaxies*. Many online games use similar systems to measure and reward players' progress.

the human capacity for appropriation and the fluidity of contemporary societies (e.g., cf. Leach, 2002a, p. 21–30 and 2002b, pp. 88–101) where "technology, far from being the necessary source of alienation, as Heidegger had supposed, may itself offer mechanisms of symbolic identification." (Leach, 1998, p. 37) Similarly, Bachelard based his essentialist description of home on his application of psychoanalysis to imagined examples derived from his personal memories or from the literary imagination of others. Habituses of authors necessarily limit such imaginary examples. Consequently, thought experiments cater badly for alternative interpretations and cannot anticipate new forms of places. The same is true of literature that takes descriptive and historical approaches to the theory of places (e.g., see Casey, 1993, 1999; Malpas, 1999). Application of these visions to contemporary urban or virtual environments is problematic because these living places invariably sustain a great diversity of lifestyles, provoke heated conflicts and undergo rapid, unpredictable transformations.

Phenomenology was fundamental for the development of the discourse on place understood as something greater than a location in space. However, most of phenomenology commits to the search for universal "essences" (Cresswell, 2004, p. 23; Seamon, 2000a, p. 157–178, e.g. in relationship to place, see 2000b): if phenomenology "is to be a foundational science, its results must be necessary truths and not contingent ones. Of the real world of individuals, one cannot assert necessary truths, unless those truths concern essences which are instantiated in real individuals." (Mohanty, 1997, p. 4) During this search for universal "essences", phenomenology often failed to look at the complexity, controversy and instability of place in the concrete examples.

"Essentialism [...] has always aroused in philosophers a certain breed of deep suspicion [...]" (Mohanty, 1997, p. 88) and recently feminism provided the most sustained "critique of essentialism, exemplifying the feminist scepticism regarding any notion of 'essence' or essential analysis [...]" (Fisher, 2000, p. 25). Feminists and other critical theorists (Mallett, 2004; e.g., see Moore, 2000) put in doubt the idea of place as home described in generic, unquestioningly positive, essentialist,

exclusionary and sentimental terms. Many people did not recognise home as a warm and caring place. For example, Rose (1993) wrote on home as a place of struggle and oppression for women or Somerville (1997) on the variability of social constructions of home. Far from being a universal foundation, place as home has contrasting meanings for groups of different age, gender and race as well as for the individuals within these groups. (Hooks, 1990; Massey, 1992).

I argue that places are not neutral. People in power define their meanings and seek to establish what is and what is not appropriate. As Massey (2005, p. 6) observes, "[w]hile place is claimed, or rejected [in power struggle between groups,] [...] there are often shared undergirding assumptions: of place as closed, coherent, integrated as authentic, as 'home', a secure retreat; of space as somehow originarily regionalised, as always-already divided up." In order to counter enforced interpretations, the analysis of places has to rely on specific examples able to address and take a critical stance towards the issues of resistance, exclusion and transgression based on age, gender, class, lifestyle, professional occupation, sexuality and ethnicity.

III.1.6 Places as systems

The dependence of virtual environments on technology has led to a widespread tendency to analyse them as machines or systems. For example, Aarseth (1997, p. 3) states that "[a] cybertext is a machine for the production of variety of expression." Similarly, Juul (2004, p. 133) writes that "a game is [...] a state machine: it is a system that can be in different states; it contains input and output functions, and definitions of what state and what input will lead to what following state." While these authors acknowledge elsewhere that the presence of human players provides for subjective meanings, the mechanistic vocabulary and conceptual toolsets skew the discourse towards the discussion of virtual environments as complete rule-based entities, activated by humans but functioning independently of them.

However, I suggest that place-making can benefit from a parallel understanding that emphasizes the socially-constructed nature of systems utilised in such places as virtual environments; examples

of which include desktop computer-games or massively-multiplayer online worlds. These environments, as other places, are not solvable systems. While in certain cases it might be useful to describe hybrid places as systems, these descriptions are too rigid to capture the complexity of situated, experiential engagements. My suggestion here is parallel to a discussion in computer science that criticises approaches describing the world in terms of plans, procedures, tasks and goals (Dourish, 2001; Hutchins, 1995; Höök, et al., eds, 2003; Munro, et al., eds, 1999; Smith, 1996; Suchman, 1987). An alternative offered by "social computing" focuses on the role of context and acknowledges reactive and situated nature of actions. Thus, writing on metaphysics and ontology of computation, Smith (1996) insisted (p. 32) that "programs in the wild" (an expression alluding to "cognition in the wild" of Hutchins, 1995) are "entrenched and connected into the fabric of surrounding events". Similarly, in his introduction to social computing, Dourish (2001, p. 16) writes that it

> involves incorporating social understandings into the design of interaction itself. That is, it attempts to understand how the "dialogue" between users and computers can be seen as similar and dissimilar to the way in which we interact with each other. Social science offers models of social action and the establishment of social meaning, which provide insight into the design of interaction with software systems. At the same time, anthropological and sociological approaches have been applied to uncovering the mechanisms through which people organize their activity, and the role that social and organizational settings play in this process.

Chess is a good instantiation of what Juul (2004, p. 133) calls "abstract games" (his examples include checkers and Tetris (Tetris (Electronica 60). SU Release, 1985). Chess is one of the most popular long-surviving games and is a common example in academic and game-design literature. Researchers often discuss it as an abstract game whose essential meaning is free of narrative or dramatic content (e.g., see Rollings and Adams, 2003). However, as lived experiences, even the most abstract games, such as chess, have multiple identities extending beyond their definitions as formal systems. These identities merge with places and are meaningful (enjoyable, romantic, exhilarating, repulsive) because of the experiences gained outside of the game as a hermetic system.

Indeed, there exists a limited set of well-defined rules that specify the mechanics of chess. Formal, symbolic notation can describe every move and serve as the basis for an accurate reconstruction of on-board events in games. The official Laws of Chess published by Fédération Internationale des Echecs (2005) describe such rules specifying the game's purpose, capabilities of the pieces, the order of play and so on.

Yet, the Laws of Chess do not talk only about the on-board interactions. For example, article 12, entitled The Conduct of the Players, attempts to regulate contextual situations by ascribing roles to people and places. In one such attempt at controlling situations in which matches take place, Fédération Internationale des Echecs explicitly states that its Laws apply specifically to over-the-board play. Non-human participation is not permissible because it changes the match situation necessitating a change in laws. Consequently, there exist different compilations of laws governing online play or computer-vs.-computer tournaments.

Furthermore, the Laws of Chess make on-board play dependent on the presence of a hosting place that has to satisfy a number of structural and functional requirements. Thus, article 12.5 states that "the playing venue is defined as the playing area, rest rooms, refreshment area, area set aside for smoking and other places as designated by the arbiter". The Laws of Chess include the concept of the spectator as well as that of a player and even regulate when and how a person can switch from one role another. For example, Article 12.4 states that "[p]layers who have finished their games shall be considered to be spectators."

In the introduction, Fédération Internationale des Echecs explicitly acknowledges that it cannot possibly predict all possible situations that might arise during a game. Rather than specifying precise rules, it appeals to the authority of precedents and the judgement of an arbiter. This example demonstrates that chess is more than a rule-bound system. Instead, it takes the form of situated performances made possible by gatherings of many human and non-human actants. As a situated performance, even such an abstract game as chess can express

itself as a place. This is even more characteristic of such dramatically and narratively saturated examples as three-dimensional computer-games and worlds. Consequently, I argue that it is not possible to adequately describe as systems even such technology-dependent and rule-saturated places as virtual environments. Instead, the discourse on games and virtual environments in general can benefit from recognising their place-like qualities and considering them as members of the same species with many other types of places.

III.2 WHAT ARE PLACES?

III.2.1 Relational places

I suggest that all places are hybrid in the sense that they include the full range of phenomena from objects to people and from nature to technology. As life experiences, they are social constructions rather than physical, digital or natural entities in the world. Capacities of human participants always form and constrain the places with which they engage. Examples of such capacities include innate and acquired perceptual abilities, personal characteristics, cultural and social circumstances, needs, motivations and patterns of behaviour. Thus, for humans, places, locations, cities, rooms, furniture, weather events, seasons and people all can function as socially constructed actants. For example, Demeritt (2001, p. 22) confirms that "an increasing number of human geographers now insist [...] that 'nature' is a social construction." In architecture, the view of nature as a social construct also gains recognition in the discussion of environmental design (e.g., cf. Guy and Moore, 2005). Hinchliffe and Whatmore's (2006, p. 124) "living cities" concept and their call to dispel the conventional divisions between "...civic and wild, town and country, human and non human [...]" exemplify this recognition. They propose three "lines of resistance" to the conventional urban analysis: 1) "cities are inhabited with and against the grain of designs—including those of capital, state, science and planning"; 2) "urban inhabitants are heterogeneous, made up of multiple differences mobilised through human and nonhuman

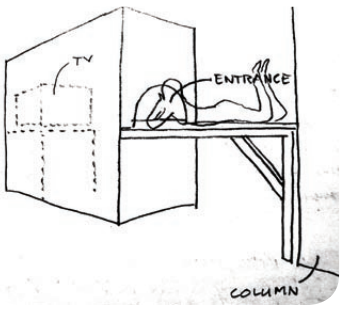


Fig. 35. *Klütterkammer.* **A video installation. (on-location sketch)**

becomings"; and 3) "urban liveability involves civic associations and attachments forged in and through more-than-human relations".

Following the line of argument suggested by the understanding of places as socially-constructed lived-experiences, I propose that places, like other technological, cultural or scientific entities are continuously re-enacted rhizomes of relationships between human and non-human actants. This perspective is useful because it provides analytical techniques that erode the customary, common-sense forms of places uncovering local, specific and often surprising situated-performances. Techniques that allow designers to look at the familiar in a new way are a foundation of creativity and I argue that a relational view of places can help architectural design to adapt to its new tasks. Furthermore, analysis of places needs to consider all types of actants without privileging one type over the others. Ontologically, human actants remain distinct from non-humans. Yet, epistemologically, these distinctions need not apply because humans are responsible for social constructions of all types of actants.

The *Klütterkammer* exhibition provided many suggestive examples illustrating how places emerge through interactions between actants. For instance, one of the boxes in the *Klütterkammer* exhibition had a semi-circular cut-out and a shelf in front of it that extended into the box creating a cantilevered seat hidden inside. With an effort, an adult could squeeze through the cut-out and into the box (fig. 35, this page).

As I observed the situation, a woman approached the box and seeing that it was free hurried towards it to claim the place on the shelf. When at the box, she waved her friends to join but was too impatient to wait for them to arrive. Before they could approach, she bent over to look into the cut-out and, with a visible start, discovered that inside there already was a person. Soon after, her friends came along and the woman felt obliged to apologize because she was unable to reward their arrival. According to my observations, in this emotional sequence the woman experienced overwhelming curiosity, exhilaration from a search and a lucky discovery, desire to share the find, shock of a sudden encounter with a stranger, disappointment at being thwarted and embarrassment for being overexcited. Contributions from the

installation structure, the layout of the Institute of Contemporary Art corridor, the workings of the monitor and the sound system and the behaviour of the other visitors all contributed to this performance giving meaning and form to her place.

In addition to being socially constructed, all places are technological because they arise from relationships between actants who engage with each other utilizing some form of technology. Historically, such technologies as dialogue, ritual, narrative, writing, classification and symbolisation, telegraph, photography and standardised time enabled and supported different form of places (Curry, 1999). For example, Curry (2002, p. 509), writing about the emergence of nation states concludes that

> here we have a region—or place—that is not defined in terms of people's everyday interactions and in terms of sets of narratives told about those interactions, as in the case of places developed among people who communicate only orally. But neither is this a region grounded simply in the written word. It is not just defined in terms of lists of characteristics, or chronicles of events, each connected with its author and the circumstances in which it was written. The particularity of the lists of individuals, maintained in a church or government office, has been replaced by the census, where individuals are of interest only in so far as they can be treated as members of a particular class. Indeed, here the individual exists only as a set of characteristics, attached to a neutral self. [...][T]he modem nation-state is a region that—in part I hasten to emphasize—is created through the production and circulation of works whose explicit aim is to characterize that place in a thoroughgoing way [...].

Contemporary technologies such as transport, information networks and simulations fulfil a similar role by enabling heterogeneous, hybrid environments (e.g., see Araujo de Souza e Silva, 2004; Ishii and Ullmer, 1999; Koch, 2004; Latour, 1999a; Latour and Hermant, 1998; Ohta and Hideyuki, eds, 1999). I understand reliance on technologies to be a necessary condition for the production and maintenance of places.

New types of places emerge every time when new technologies of communication and representation become available. The link between types of places and related technologies is so strong that it is impossible to understand communication technologies of a historical

period without a consideration of space and place conceptualisations prevalent at the time. Dialectically, it is also impossible to understand conceptualisations of space and place without the understanding of the available technologies. While the interdependency between places and technologies is not a new development, contemporary digital technologies create new place-making conditions just as the introduction of other technologies did in the past. For example, a number of researchers discussed how mobile-communication devices reconstruct the situated, social interactions thus contributing to the making of new places (Araujo de Souza e Silva, 2004; Brown, et al., eds, 2002; Katz, ed., 2003; Katz and Aakhus, 2002; Rheingold, 2002).

I argue that in spite of their fundamental role, technologies do not determine but, rather, afford place-production. Multiple alternative places can arise in the same technological conditions. In this, my position differs dramatically from a romantic stance that sees contemporary technologies as a never-before-seen force that erodes and trivialises places. Even though people invent, or socially construct, places and utilise technology to sustain them, new types of places are as meaningful and important to their participants as any other places in the past. They are just as able to support communities and express vital social structures (cf. Mitchell, 1995, 1999, 2003 on contemporary urbanism).

If places assisted by the contemporary digital technologies are as legitimate as the places in the past, place-making disciplines, including architecture, need to learn to utilise the new possibilities given by such technologies to their full potential even if engagement with such technologies is difficult and dissimilar to the traditional architectural practices.

As a corollary relevant to the understanding of new places occurring in virtual or augmented environments, the necessary interdependency between technologies and places makes irrelevant conceptual boundaries between physical and digital environments. The physical/digital hybridism of places becomes increasingly common in everyday life where hidden computers become widely integrated with the physical environments and computer-supported representa-

tions become prevalent in business, education and entertainment. Of the many examples, one particularly illuminating for my present purposes is mobile communications. Mobile devices provide transportable on-demand access to global digital networks such as the Internet. Physical locations, where the access takes place, frame the conditions of this access, yet the resultant hybrid places cannot exist without digital technologies. Even a common analog phone-call joins two physical locations into a personal construct shared by the speakers. Mobile devices joined into networks take this digital/physical geography further as they enable construction of hybrid places that are persistent, dynamic and open to numerous simultaneous participants.

I suggest considering places—from a Black Forest hut to Quake—as hybrid, technologically sustained environments. These environments, or habitats, participate in "information ecologies" of systems "of people, practices, values, and technologies in a particular local environment." (Nardi and O'Day, 1999, p. 49) To understand the form and the role of places in such ecologies, it is necessary to consider participations that cross boundaries between the human, digital and natural.

Since its early days, the virtual-reality community talked about virtual environments as distinct worlds that could exist hermetically, in isolation from the everyday life. Such insular worlds could, many argue, have completely different circumstances of engagement such as unearthly physics, geometries or modes of navigation. For example, with the notable exception of Morningstar and Farmer's (1991) socially-aware paper, this is the dominant mood of the influential compendium by Benedikt (1991). This understanding of virtual environments as distinct and isolated from the everyday world granted that their visitors could experience complete immersion. A large number of researchers studied various concepts based on this presumption including, for example, the concept of "presence" (e.g., cf.Slater, 1999; Slater and Steed, 2000). However, I argue that complete immersion is impossible and that even the most abstract virtual environments cannot escape references to the experiences of the everyday life and their customary affordances. As Buscher and Hughes (1999, p. 90) show, "in order to be intelligible, virtual worlds have to exhibit at least

some familiar features." Virtual environments link with geographical locations. People access them in characteristic circumstances and experience them intermittently with other life activities. Furthermore, "being in virtual worlds is formed by the participants' understanding of the system and their inherent desires." (Croon Fors and Jakobsson, 2002, p. 1) I suggest, therefore, that they are interesting and meaningful as hybrid components of wider place-performances rather than insulated worlds with arbitrary rules and laws.

Non-physicality of actants does not make them less significant for the participants. People do not live "outside" of information (Munro, et al., eds, 1999, p. 1). For example, virtual objects can create very real relationships. A quick search through online traders brings up numerous offers on in-game items even though many online-world developers denounce such trade as illegal, for example in end-user license agreements distributed with their software. Some estimates suggest that the annual turnover at this black market is worth hundreds of million of dollars. Trade in virtual items has triggered concerns about intellectual-property rights, ownership, governance, labour protection and human rights. When players buy virtual items, they modify their involvement not only with the game but also with the non-digital worlds that contain their everyday lives. Production of high-level in-game artefacts can be a very complicated and labour-intensive process requiring extensive cooperation, expertise and time. The structure of involvement enabling each virtual item extends uninterrupted between physical and digital worlds.

Virtual West Cambridge provided useful illustrations of the relational and hybrid characteristics of technology-saturated places. Originally, we planned to distribute it on compact disks or as downloads, and imagined usage similar to participation in single-player games. Even though *Virtual West Cambridge* was ready for such distribution, clients have seldom attempted to run it on their machines. In spite of this, they remained interested in the project and continued its funding. Analysis of *Virtual West Cambridge* as a technical artefact cannot explain its continuing usefulness. Where technical analysis fails, a broader understanding of place as a social performance helps to ac-

count for varied and unexpected patterns of appropriation and usage.

In the *Virtual West Cambridge* project, the outward-reaching relationships connecting the virtual with the physical and the technological with the human linked specifications of particular computers with the presentation of the environment, locations of computers running the virtual environment with the impact on experients, background and interests of experients with the various emergent usages, the composition of the maintenance team with available meanings and the membership in particular networks with accessibility. Disentangling of these and similar heterogeneous relationships can help architects understand the scope and the impact of technology-saturated places they set out to design.

Over the years, *Virtual West Cambridge* emerged not as a single-user, desktop virtual-environment but as a series of performances staged in offices, studios, seminar rooms, lecture halls, at exhibitions, festivals and open-day events. These performances involved at least one but usually several developers of the virtual environments and, often, various participants of the physical-site development. These collaborative encounters attracted versatile audiences that differed in size from several to hundreds and in familiarity with the project from none to intimate. These people together with non-human actants, communicating in physical locations, enacted *Virtual West Cambridge* as a series of meaning-making situated performances with unique benefits impossible in the privacy and detachment of desktop access-mode.

For example on 8 July 2004, the Estate Management and Building Service ran a Construction Seminar and an exhibition in the Centre for Mathematical Sciences building in Cambridge. More than 200 UK and oversees delegates specialising in design, construction and education attended the event. According to the Estate Management and Building Service (2004), "the seminar looked at the affordability of high quality standards of architecture and construction, and challenged attendees to consider their role in the continued improvement of working practice in the industry".

The central core of the building occupied by the exhibition was a large open-space area. The exhibition organisers subdivided it with temporary stands. We set up *Virtual West Cambridge* in an arrangement familiar to attendees of industrial exhibitions. The virtual environment ran in a niche bounded by the stands and next to the path connecting the main entrance, the exhibition and the café. In the niche, a laptop sat on a table ran the virtual environment. A digital projector duplicated the laptop's screen in large format on the stand ahead of the table. There were several chairs and some empty space behind the table. A poster containing information about our studio hang on the wall and leaflets describing our work lay on the table.

When the Estate Management and Building Service ran lectures, only a few people remained in or passed through the central core. Between the lectures, it became crowded. Two development-team members were usually available at the *Virtual West Cambridge* niche and in the busy moments, employees of the Estate Management and Building Service and other consultants joined in. In quiet moments, the projection showed the virtual environment via an automatically moving camera but most of the time I navigated the camera or the avatar using a keyboard and a mouse. My presence at the installation attracted attention, explained that the virtual environment was navigable and invited questions. I was able to invite visitors to navigate, offer instructions and assistance. We did not offer formal presentations. Instead, I improvised based on many rehearsals and previous public presentations. Visitors asked many questions and actively discussed the issues with each other. Even when not asked directly, I was able to interfere and offer additional information or advice on the issues that could otherwise remain unexposed to the potential users or the development team. Many visitors came to see *Virtual West Cambridge* more than once. People who first came in a busy moment returned for a one-to-one discussion and a closer experience of the virtual environment in less busy times. On the other hand, people who first came in quiet moments sometimes returned to see the reactions of the others, to meet new people and to exchange opinions.

There were multiple benefits to this performing of *Virtual West*

Cambridge as a hybrid place mixing physical and virtual. Public place-performances provided topical forums that helped to focus the presentation of the virtual environment on the issues of concern that stakeholders found significant. Public place-performances also helped to establish communication between participants so that they had something to discuss when they were coming to see the virtual environment.

Developers of the virtual environment were on hand to help with the use of technology. They were able to show important parts of the virtual environment in response to the ongoing discussion, take care of or assist in navigation, troubleshoot in case of problems, set-up and start the application in varying circumstances. Developers were also able to provide in-context reflection and critique of the virtual environment including the information on the limitations, the background of its development, stories of its implementation, reflections on the possibilities for the future and comparisons with similar projects. Other collaborators (including consultants, clients, site developers, engineers, landscape architects) were able to provide expert opinion, contribute multiple perspectives on the issues under consideration, draw attention to the issues beyond those directly represented by the virtual environment and point out the issues on which the virtual environment was incomplete or misleading.

A wide range of people beyond those involved with the project could see it and contribute opinions. For the development team, their interaction with the virtual environment was a valuable resource for learning. Provoked or encouraged by the virtual environment various groups of stakeholders were able to question the attending experts. All of the participants were able to assume various roles: navigators, commentators, questioners. The ability to change roles in response to challenges arising from the discussion or for experimentation helped the participants to appreciate the spectrum and complexity of the issues making up the West Cambridge development project.

Public place-performances of *Virtual West Cambridge* also supported serendipitous communications between stakeholders. Navigating or being present next to *Virtual West Cambridge* did not prevent peo-

ple from overhearing the explanations given by the experts or participating in the discussions. Often, I navigated through the environment following suggestions of the visitors looking for visual support to their arguments or interested in technical and expressive capabilities of the virtual environment. Other people could hear these suggestions and see their on-screen consequences. Observing the choices and comments of others, visitors often intervened with comments of support or disagreement.

Public place-performances of *Virtual West Cambridge* brought together people that normally had little opportunity for communication. For example, researchers and students of the Centre for Mathematical Sciences came to see *Virtual West Cambridge* and were able to enter into conversations with the experts attending the seminar. By presenting the issues in a visual and navigable form, *Virtual West Cambridge* contributed to the task of translation necessary between parties of widely varying backgrounds.

Another benefit of public place-performances consisted in the fact that they gave voices to multiple, potentially disagreeing parties. Experts offer narratives that benefit their interests whenever they deliver a presentation. They do it by focusing on particular aspects, providing targeted visuals, referring to other situations and presenting their views as coherent and well-reasoned. Their rhetorical efforts aim to preempt or respond to the known issues such as costs, functional efficiency or security. For example, perspectival architectural drawings often show proposed buildings in the most spectacular aspect, in favourable light, populated by happy crowds. This focusing on the more universally relevant, positive qualities is only natural for designers promoting their projects. However, if unchallenged, experts' narratives can overlook significant issues. In a public setting, constituents can question the way experts represent design situations, formulate problems and justify design actions. The presence of development-team members, client representatives and consultants involved with the West Cambridge site development helped to deliver complex and often contradictory stories about the site. In the absence of these people, these stories would be less understandable or even remain inac-

cessible. Building such stories as self-sufficient entities into the virtual environment would require fixed narratives ill-compatible with the dynamic and experimental nature of the project.

Responding to the circumstances of a particular public performance, the development team in consultation with the other stakeholders were able to construct custom environments pre-designed or adjusted on location to suit the venue, the size of the audience, the type of audience interactions and the available technical capabilities.

Public place-performances allowed us to fully utilise technical capabilities of hardware and software. Through multiple rehearsals involving clients, experts and designers, host places, software and the equipment we were able to optimise *Virtual West Cambridge* to match the capabilities of a custom-built computer. We upgraded and rebuilt this computer repeatedly to suit the needs of the growing virtual environment. This machine was one of several among the increasingly fast benchmark-computers that defined the top level of complexity for *Virtual West Cambridge*.

Building *Virtual West Cambridge* as a symbiosis of custom-built hardware and software allowed us to save resources. Allowing other computers to run *Virtual West Cambridge* would necessarily involve more preparation, making the project more expensive and time-consuming, effectively making it unfeasible at the same scale of complexity. Even developers of high-profile videogames constrain their software to a limited range of hardware because exhaustive testing is impossible. Despite such self-imposed limitations, they usually have to maintain technical-support departments and issue patches long after the initial release. In research or architectural practice, such provisions and the testing required are usually prohibitively expensive.

Distributing *Virtual West Cambridge* as software could prevent participation by people lacking access to functional hardware. Potential participants could not own such hardware, be unable to make it work or unwilling to learn how to operate it. Unlike commercial videogames, *Virtual West Cambridge*, and other architectural virtual environments, could not rely on the equipment and expertise of dedicated and experienced gamers.

Sequences of public presentations created a cumulative effect for the participants who attended more than one event. They were able to pursue the development of long-term issues and continue conversations in the presence of different groups of stakeholders. For the development team, the intermittent character of public engagements provided opportunities to respond to comments and suggestions that required further research and implementation.

In another benefit of public mode of access, visitors could refer to the character of the surrounding physical location in order to compare the affordances of one university site to another. Such references were relevant because the Centre for Mathematical Sciences was a building recently completed by the Estate Management and Building Service who also acted as the client for *Virtual West Cambridge* and were responsible for all construction work within the university. Presenters could also refer to other projects and virtual environments and show them in order to support discussion of ongoing work and future capabilities.

Public place-performances allowed us to stage engagements using a virtual environment in the state of ongoing development. Such access can be instrumental in making the development of architectural projects more open and accountable. The presence of experts who designed and built the environment helped to overcome the technical problems confusing for first-time or infrequent participants. Elimination of such problems prior to the admission of external participants would necessitate locking the virtual environment into a stable form. Only when developers terminate the design process and lock the form of a project does it become possible to transfer into production, which features such routine but essential tasks as testing, fine-tuning and debugging. Without extensive testing, people outside the development team cannot usefully access any but the simplest virtual environments. Self-standing virtual environments also require documentation covering installation and functionality. Production of such documentation is also considerably easier when design and development are complete.

In *Virtual West Cambridge*, and in many other similar situations,

enforced stabilisation of form would undermine the utility of the virtual environment for design, research and consultation. In the case of *Virtual West Cambridge*, flexibility and dynamism were essential because the project supported the West Cambridge site that was in continuing long-term development. The project also relied on rapidly developing technological base—both the software and the hardware used to maintain virtual environments change rapidly. Moreover, the project resided in rapidly changing cultural and professional contexts that regularly suggested new ways of utilising technology and involved multiple constituents with a diverse range of involvements and opinions. Additionally, the project served as an experimental playground for testing multiple simultaneous technical solutions and modes of representation—the kind of representation only possible in a flexible, dynamic stage of designing. Conceptualisation of *Virtual West Cambridge* as a hybrid place rather than as a piece of software, an insular virtual environment or a mediated effort at propaganda allowed us to learn from multiple stakeholders and inform the continuing experimental development in parallel with public presentations.

The experience of building and staging *Virtual West Cambridge* as an accessible place-performance also suggested improvements to the project. An assembly of representations complementing each other, rather than one dominant version, could better reflect the multiplicity of the West Cambridge site and similar architectural virtual environments. *Virtual West Cambridge* already contains several such representations including diagrammatic representation of zoning and massing with coloured blocks, integration of photographs into building textures, use of photographs as two-dimensional billboards to represent vegetation and buildings, custom-textured three-dimensional content, two-dimensional interface elements, two-dimensional representations of photographs, drawings and architects' sketches as well as an atmospheric audio.

In the context of a public performance, relationships between alternative visions of the site could be clearer if available in parallel, perhaps projected on additional screens, synchronised or available for unconstrained navigation as appropriate. In addition to the existing

representations, parallel screens could include studies of secure access and surveillance, representations of daily and seasonal lighting changes, animation of construction stages, etc. Simultaneous access to these representations could contribute to the constructive dialogue already staged by the public performance of *Virtual West Cambridge*, enabling comparisons and additive effects similar to those attained by the simultaneous exposition of traditional architectural material (e.g., cf. Yaneva, 2005a).

Visual representation of individual or collective performances of visitors during public place-performances of *Virtual West Cambridge* could further support social navigation and knowledge transfer. This feedback could be real time or recorded. Real-time feedback could influence in-the-experience decision-making. Reflection on recorded traces of behaviour could allow discussion that would be disruptive during real-time exploration.

Inclusion of stakeholder's viewpoints, for example in the form of video interviews, is another device able to facilitate discussion among the participants attending a public performance. This idea influenced the design of *Virtual Braunstone*, where we integrated cameos of clients, local residents, contractors, architects, engineers and other participants into the virtual environment. We supported these interviews with visuals that included simulations, animated sequences and diagrammatic representations that proved to be one of the most-actively discussed features of the virtual environment.

Support for the warming up and cooling down stages of performance could enhance the experience of virtual environments. Game and software-development communities have developed a range of strategies useful for this purpose. Examples include mailing lists, user forums, websites, newsletters, blogs and wikis with their content repositories.

III.2.2 Multiplicious places

Places are assemblies of multiple forms performed by multiple heterogeneous actants. Performances of actants accrue into assemblies of narratives. Every actant constructs multiple interpretations corre-

sponding to their multiple identities. These multiple identities perform, often simultaneously, in multiple, often overlapping, places. This messy, multiplicious enactment lacks unified meanings or indisputable interpretations. Instead, actants actively construct performance narratives using available resources and in response to their needs. Their individual or collective interpretations are often divergent or even incompatible.

As Habraken (1998, p. 16) argued,

> The physical organization of a built environment may be described in many ways, depending on one's particular scale and focus of concern. [...] For example, an architect may describe a house as a composition of spaces. But a builder may prefer to describe it as an organization of material parts. A painter may describe it as a combination of planes distinguished by their colors. In describing the same house, a poet may name parts whose properties evoke reference to things in the past or at other places. Or she may allude to feelings, drawing unexpected analogies that give it new meaning. Finally, inhabitants tend to think in terms of rooms and places: not mere spatial entities, but combinations of many types of things—furniture, artwork, views—that jointly make an environment identifiable.

My understanding of places as socio-technical hybrids allows the import of knowing from sociology of science and technology. For example, Law's (2002) account of the multiple identities of an aircraft or Mol's (2002a) presentation of "enactments" of the multiple identities of atherosclerosis provide suggestive examples. As Law (2003) stated in his discussion of the reality-making performance of a medical textbook—"multiplicity is always to be expected in a performative world."

In application to architectural design, cf. Yaneva (2005a, p. 535) demonstrated that at the design stage buildings exist as additive, stabilised "collections" of multiple models. These collections reflect the nature of the building as "an assembly of assemblages, pluralistically constituted, genuinely additive, marked by manyness". Similarly, Harbison (1991, 1998, 2000) highlighted the multiplicious and subjective character of architecture and Whyte (1980, 1988) researched and discussed multiple and subjective emergent-interactions in urban environments.

Similarly, writing about landscape, Meinig (1979, p. 33) insisted in his influential article that "any landscape is composed not only of

what lies before our eyes but what lies within our heads". He described ten possible interpretations of landscape as nature, habitat, artefact, system, problem, wealth, ideology, history, place, and aesthetic.

In text-based virtual environments, Bartle's (1996) taxonomy of motivations in multi-user dungeons provides another example of multiplicity caused by differences in individuals' involvements. His taxonomy includes four possible types of players: achievers, explorers, socializers and killers. Constructed from a designer's utilitarian position, Bartle's taxonomy covered only participants compliant with the designers' inscriptions. While I do not accept his taxonomy as exhaustive, it is useful as an illustration of alternative and conflicting engagements typically afforded by online worlds such as multi-user dungeons or massively-multiplayer online-games.

Emerging hybrid, distributed, global places made of flows and involving highly mobile participants do not escape multiplicity. For example, Massey (1994a, pp. 148, 149) shows how "space-time compression" brought about by faster travel and digital technologies is drastically different for people with different education or in different economic circumstances.

> Imagine for a moment that you are on a satellite, further out and beyond all actual satellites; you can see 'planet earth' from a distance and, unusually for someone with only peaceful intentions, you are equipped with the kind of technology which allows you to see the colours of people's eyes and the numbers on their number plates. You can see all the movement and tune-in to all the communication that is going on. Furthest out are the satellites, then aeroplanes, the long haul between London and Tokyo and the hop from San Salvador to Guatemala City. Some of this is people moving, some of it is physical trade, some is media broadcasting. There are faxes, email, film-distribution networks, financial flows and transactions. Look in closer and there are ships and trains, steam trains slogging laboriously up hills somewhere in Asia. Look in closer still and there are lorries and cars and buses, and on down further, somewhere in sub-Saharan Africa, there's a woman - amongst many women - on foot, who still spends hours a day collecting water.

She concludes (ibid.) that "[d]ifferent social groups have distinct relationships to this anyway differentiated mobility: some people are more in charge of it than others; some initiate flows and movement, others don't; some are more on the receiving-end of it than others;

some are effectively imprisoned by it."

The multiplicious character of places permits any physical structure or location to participate in many overlapping and mutually exclusive places. One of the relationships between places is incompatibility—for example, an improvised football pitch is impossible in the middle of a street at rush hour. Another type of relationship is nesting—for example, a homeless person's bedroom is a warm air exhaust at the side of a busy street. Foucault (1967, n. pag.) considered a related clustering of places in his discussion on "heterotopia"—"a kind of effectively enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted." Similar to nesting is superimposition—for example, a river bank is a running path for a jogger and a place to fish from for an angler. Often, observers and participants cannot clearly distinguish between multiple forms of places that can easily mutate into each other—the identity of places often has a fluid character.

Among my case-studies, the *Virtual West Cambridge* project was a characteristic example of multiplicity. Different forms of the project emerged in response to the varying perceptions of participants whose involvements and roles changed many times over the project's lifetime. New reincarnations of *Virtual West Cambridge* also had to emerge in response to the modifications of the performing cast including people, hard drives, graphic cards, random-access memory and processors. We had to adapt each performance of *Virtual West Cambridge* to the capabilities of the cast available for the occasion. Because we designed *Virtual West Cambridge* so that various participants could use it independently, we also had to imagine and cater for possible future casts. In response, we produced inscriptions to suit a variety of involvements, suggesting several different forms of *Virtual West Cambridge* as a place. Performances as they happened often did not comply with our inscriptions and introduced further variety. Furthermore, *Virtual West Cambridge* involved people in different settings, gathered different audiences, used different furniture, occupied different rooms and appeared on different screens. The occasions varied from formal to casual and the sizes of audience from one

to hundreds. These differences in staging conditioned many collaboratively-constructed forms of *Virtual West Cambridge*.

In another example of multiplicity, *The Parasite* project simultaneously or alternately functioned as 1) a research project that tested ideas, developed new techniques and generated publications; 2) an educational project that set up a participatory learning environment; 3) an experimental construction that generated and tested unique structural and engineering solutions; 4) a management exercise coupled with a complex fundraising and logistics campaign; 5) a networking exercise that created collaborations and friendships; 6) a mode of travel that took its participants to new sites, cities and countries; and 7) a publicity exercise that output posters, presentations and film screenings. These multiple and often simultaneous ways of engaging with *The Parasite* conditioned performances of its participants modifying existing and constructing new meanings for various locations and helping to assemble them into significant memorable places. The forms of *The Parasite* project listed earlier are the successful forms that either performed closely to the designers' inscriptions or fitted well with participants' post-rationalisations. There were also multiple other, ill-defined forms of failed punctualisations. For example, various parties could complain that 1) the videos of dance performances were not recognisable as such amongst the other visual content; 2) the materialised structure did not match the digital models produced in the design stage; 3) we did not assembled about one third of the pre-produced components and the visiting public did not see them; 4) we did not complete the construction in time for the grand opening; and 5) for a considerable period, scaffolding cluttered the stairwell and prevented the visitors from seeing the visual content. Again, as with visions of success, these interpretations conditioned participants' involvements with the project and the places it helped to create.

It is impossible to give a universally satisfying, correct or exhaustive account of a place because many actants remain hidden from any participant or observer in any encounter. Arguing for the ever-present multiplicity of unobvious participants in social situations, Latour (2005, p. 201) insisted that

> interactions are not synoptic. Very few of the participants in a given course of action are simultaneously visible at any given point. [in a lecture hall] The lecturer might believe she is center stage, but that does not mean that many others are not acting as well, only that there is no way to sum them up. The wooden desk was not part of the lecture before she pointed it out as an example of design, and yet it does something; it is one of the ingredients that helps put it into shape, allowing interaction to be framed. So was the slip of paper that advertised the lecture and set the appointed time and space even though she did not highlight it. But if we wanted all the ingredients of this scene to stand up and be counted, we will not be able to do it because there is no way to underline all of them at once, either because there are too many or because they are part of complicated machineries that are necessarily hidden if playing their part as efficient intermediaries.

Similarly, we intended *The Parasite* project to be an interactive installation and specified a suitable cast for such a performance. This cast included a physical structure, projected images, and an audience. Valid members of this audience included many participants in addition to the ticket-buying exhibition visitors. For example, the Parasite needed maintenance. Engineers from a private company hired to service the Biennale came twice per day to turn on and off the projectors and computers. For the engineers, the installation was a routine job among many and they treated it as such. Their day ended at six, when the museum exhibitions normally closed. They did not care that *The Parasite* was located in the stairwell leading to the performance area hosting late shows of the Biennale program. When the engineers switched off the electricity, the interactive installation ceased to exist for all the visitors coming to see the evening shows. Thus, the performance of the engineers while invisible to the museum visitors and unacknowledged as art was as vital as the performances of the visitors or such other actants as guards, designers, volunteers, computers, projectors, walls, floors or doors. Without the performance of engineers, *The Parasite*'s form transformed from that of an interactive installation into a sculpture, a pile of junk, a building site—into something else.

Alternative, often unobvious and potentially subversive, engagements are present in every place. For example, Jakobsson and Pargman (2005, n. pag.) used the concept of a "black box" to discuss vir-

tual environments in terms of privileged and subversive roles and to "describe players' efforts to open up this black box in order to get access to and play other roles—roles not prescribed by the game publisher and that in some cases function as a threat to the publisher's business model." These alternative engagements are as valid or interesting as the primary engagements inscribed and promoted by the designers. The view of places as multiples calls for re-evaluation of many aspects of architectural design including strategies for data collection and analysis, collaborative strategies, approaches to creativity, understanding of appropriation and usage as well as plans for disassembly, recycling and repurposing.

Each actant in a place-performance is in turn also a rhizome. For example, Ryo in *Shenmue II* is an assembly of rhizomes linked to multiple parallel realities. In one of his guises, Ryo is a fictional character with a background story distributed among multiple carriers, patchy and dynamic. In accessing this story, players engage in a variety of performances: read adverts in shop windows, game magazines, on television and websites; read and post in discussion boards; follow rumours, arguments, gossip, see screen grabs and spoilers; read the blurb on the packaging and watch in-game machinimas[1] telling the pre-scripted story in tiny episodes. Simultaneously, Ryo is a navigation device. *Shenmue II* constrains the player by the functionality of Ryo's avatar such as his size and kinaesthetic capabilities. He is able to move through "open space" but not through walls and objects, carry items, enter into dialogue with the other in-game characters, battle and so on. Apart from being able to navigate, Ryo also can perceive, think and feel. He remembers things, has idiosyncratic reactions to game-events and exhibits will in his communications with the environment. Because Ryo demonstrates a growing ability to usefully exploit his environment in situations where players could not proceed due to the lack of necessary information on game locations and their inhabitants, players sense that Ryo possesses an actively developing mental collage of his socio-spatial milieu. They learn that Ryo's com-

1. Machinima is a technique of making movies using engines intended for real-time rendering of three-dimensional geometry. Computer games use machinimas for narrative purposes. Machinimas also became an independent movie genre.

prehension, familiarity with the world and goals are distinct from theirs. In certain moments, Ryo speaks, gesticulates, fights and thinks aloud with no player-input. Players do not know the exact consequences of exercising agency via Ryo's avatar. The best they can manage is educated guesses. Finally, Ryo is also a representative of players within the game-world. *Shenmue II* invites the player to inhabit its world and have adventures there. Players bring their personalities, interests, educations and practical circumstances with them into the play.

Behaviour in places does not have to follow designers' prescriptions. It is impossible for designers to imagine all possible performances that can take place. Moreover, some places provoke alternative behaviours creating potential for conflict and drama. For example, during the *Klütterkammer* exhibition I observed a couple who moved through the corridor skipping from one niche to another, excitedly, torn between choices. They parted as the woman stopped to glance over the shoulders of others into a vertical cut-out of one niche while the man hurried to another niche noticing that it was empty. He squirmed onto the chair and went out of sight. His partner glanced away from her niche to check where he was and could not see him. She stepped away from the niche to find him and saw him leaning out from under the box, beckoning her towards him. She ran up to him and together they struggled onto the chair and into the cut-out. For these people the box functioned not as storage of visual artefacts but as a stage for courtship. Another subversion in the same environment occurred when a group of children filled the corridor. They changed positions very quickly, never staying long enough to watch the movies placed within the boxes. The exhibition became a competitive playground where the access to good viewing positions was the prize. Children occupying the best positions did not bother to watch the movies, preferring to communicate to each other.

An uncritical attitude to the construction of social roles can cause designers to side with the already-dominant forces at the exclusion of other constituents. Beginning with Ong's (1975, p. 9) insistence that "the writer's audience is always a fiction", media studies have long

problematized audience as a social construct fluctuating between the concepts of addressed and invoked audiences (e.g., cf. Ede and Lunsford, 1984, p. 156). Recent research in design has also begun to problematize the concept of users and has expanded it to become that of participants, stakeholders or constituents (e.g., see Dunne, 1999; Dunne and Raby, 2001; Krippendorff, 2006). Architects and designers need methodologies that can help them to consider how they construct the participants of their creations.

Often, future experients of a hybrid place are provisional constructs assembled by designers as compliant targets of their efforts. These assemblages mix together hopes and aspirations, habitual dispositions, theories-in-practice and the expertise gained through precedents or surveys. For example, Woolgar (1991, p. 59) shows "how the design and production of a new entity (a new range of microcomputers) amounts to a process of configuring its user, where 'configuring' includes defining the identity of putative users, and setting constraints upon their likely future actions." In contemporary design discourse and market-speak there are persistent calls for "user-oriented design". Yet, often, practitioners and researchers assume characteristics of "users" without due research and reflection. Lacking participatory-development strategies, user-oriented approaches lead to autobiographical design that assumes that users are similar to the designers. Oudshoorn et al. (2004, p. 30) shows "how configuring the user as 'everybody' and the use of the 'I-methodology' are important constraints in the development of technologies that aim to reach users in all their diversity." (also, see Akrich, 1995, pp. 167–184) Despite the intentions, the results achieved via such approaches are not for everybody but for the people much like the designers who are often young, white, educated, privileged men. Among my case-studies *Virtual West Cambridge* illustrated how openness to multiplicious interpretations in public-performance settings can help to offset such biases. Place-performances staged by *Virtual West Cambridge* succeeded in involving people who, lacking access, background, expertise or time, would otherwise be disinclined to experiment with a game-like virtual environment.

III.2.3 Fluid places

The view of places as multiples makes them more complex and less knowable than objectivist or essentialist approaches might allow. The complexity of the concept increases yet further upon the recognition that not only places are multiplicious, but that their multiple forms are also fuzzy and fluid. Similarly, Mol and Law (1994, p. 643) suggest fluidity as a term for one of three metaphoric "topologies" of "social spaces". According to them, this metaphor suits where "neither boundaries nor relations mark the difference between one place and another. Instead, sometimes boundaries come and go, allow leakage or disappear altogether, while relations transform themselves without fracture."

The metaphor of fluidity emphasises the processual character of contemporary societies and of the places they produce because every place encompasses movements of heterogeneous actants such as people, objects, ideas, images, commodities and capital. For example, Bauman (2000, p. 2) suggested that mobility and inconstancy "are reasons to consider 'fluidity' or 'liquidity' as fitting metaphors when we wish to grasp the nature of the present, in many ways novel phase in the history of modernity." "When describing solids, one may ignore time altogether; in describing fluids, to leave time out of account would be a grievous mistake. Descriptions of fluids are all snapshots, and they need a date at the bottom of the picture." (ibid.) Similarly, and with more focus on the architectural problematique, Habraken (1998, p. 7) argued that "the very durability and transcendence of built environment is possible only because there is continuous change. In this respect, built environment is indeed organic: continuous renewal and replacement of individual cells preserves it, giving it the ability to persist."

Even the most stable places are temporary because their participants constantly re-enact them. As Latour (2005, p. 37, 38) insisted, "the object of a performative definition vanishes when it is no longer performed—or if it stays, then it means that other actors have taken over the relay." For example, a family home responds to temporal cycles such as seasons, holidays, birthdays, or renovations (Tuan, 1977).

On city street shops open and close, cars congest into traffic jams in the rush hours and vacate the streets for a Sunday market. People coordinate their performances according to the temporary affordances staged by the performances of other actants. Pred (1984, p. 279) suggests seeing places "as a process whereby the reproduction of social and cultural forms, the formation of biographies, and the transformation of nature ceaselessly become one another at the same time that time-space specific activities and power relations continuously become one another." However stable or cyclical, places always undergo irreversible transformations. While all actants have to comply with existing physical or social structures, their behaviour is creative and never fully predictable or repeatable. Therefore, while places have conditions achieved in the past, in each present moment they are different. With time, places can change beyond recognition.

Humanist geographers influenced by phenomenology and many others invested in the existing places also registered the increase of movement in places. However, essentialist and conservative understandings of place led them to believe that widespread change and mobility undermined places (e.g., see Relph, 1976; Tuan, 1971, 1974, 1977, 1980, 1984). Similarly, Augé (1995) saw movement as a characteristic of "non-places". Contrastingly, Seamon (1980; 2000a, 2000b), another geographer with a phenomenological stance and an interest in architecture, discussed place as a pattern of movement rather than a source of authenticity and rootedness. In his view, habitual movement of people in the environment produces a sense of place or "place-ballet",—"an environmental synergy in which human and material parts unintentionally foster a larger whole with its own special rhythm and character." (Seamon, 1980, p. 163)

I consider fluidity of places to be an opportunity rather than a problem. My understanding of places as socio-technical hybrids allows me to learn from research in social studies of technology. For example, de Laet and Mol (2000, p. 225) in their case-study-based discussion of what makes a particular design of a bush pump an "appropriate technology", report that

> [t]his turns out to be what we call the 'fluidity' of the pump (of its bounda-

> ries, or of its working order, and of its maker). We find that in travelling to intractable places, an object that isn't too rigorously bounded, that doesn't impose itself but tries to serve, that is adaptable, flexible and responsive—in short, a fluid object—may well prove to be stronger than one which is firm.

Similarly, I suggest that an understanding of technology-saturated places as fluid formations can enable place-making approaches resulting in more durable and meaningful outcomes.

Another way to express the conditions of ongoing change in places is to say that places—as any other punctualisations (Law, 1992)—are never complete. Irrespective of designers' wishes, the true closure never occurs—stability of a place occurs through continuing negotiatory performances. These negotiated compromises attained by actants do not constitute closure. Instead, human and non-human actants make places—attain "sameness"—while maintaining differences in engagements and interpretations. As Dugdale (1999) concludes in her discussion of science-related policymaking, closure is "a story of oscillation between sameness and difference, of doing singularity and multiplicity together."

Just as it is possible to be in several places at once, it is also possible to follow multiple, simultaneous time streams. A common name for this phenomenon is multitasking while researchers of organisations and information technology discuss this type of mobility as "polychronicity" (Barley, 1988; Lee, 1999). As Latour (2005, p. 200, 201) puts it

> no interaction is synchronic. The desk [of a lecturer] might be made of a tree seeded in the 1950s that was felled two years ago; the cloth of the teacher's dress was woven five years ago, while the firing of neurons in her head might be a millisecond old and the area of the brain devoted to speech has been around for a good hundred thousands years (or maybe less [...]). As to the words she uses, some have been introduced into English from foreign languages four hundred years ago, while this rule of grammar might be even older; the metaphor she chooses is just six years old and this rhetoric trope straight out of Cicero; but the computer keyboard she has typed her speech on is fresh from Apple, although the heavy metals making possible the coordination of some of its switches will last for as long as the universe. Time is always folded.

Digital technologies enable asynchronous communications that

break the temporal continuity of task completion. In fact, polychronic engagement is a prevalent characteristic of digital media. Polychronicity is a consequence and an enabler of multi-presence. As people inhabit several hybrid places simultaneously, their time-flows break into patchworks. Rather than staying with one time stream until the moment of resolution, for example until a task is complete, participants migrate from one stream to another as their circumstances and preferences dictate.

Boundaries of places are also always fuzzy and subjective. In principal, linking between actants extends indefinitely but in practice, the number and character of linking depends on the circumstances of the actants. Thus, boundaries of places are socially constructed rather than physical. While architects usually think of spatial or visual boundaries, rules in sport, play or games, scripts in theatre, or capabilities of a digital interface can all contribute to making of places. For example, arriving to the *Klütterkammer* exhibition for the first time, I found the Institute of Contemporary Art crowded. People milled about, stood at rough-looking plywood structures and looked at each other. Habitués marched past to the café. Employees ran errands. I saw no instructions for action. *Klütterkammer* deliberately blurred the boundary between the performed and the everyday, questioning the punctualised, conventional notion of an art exhibition. I did not know where to go, what to touch or leave alone and whom to turn to for advice and authority. The typical layout with paintings on white walls and sculptures on pedestals was amiss. I realised that I had to search for the art I expected to find prepared for my visit. This first encounter illustrated the fluid and negotiable character of *Klütterkammer's* boundaries. They did not coincide with any one person's vision or with the designer's inscriptions. Instead, participants had to construct their rules of engagement through encounters with other performing actants.

In places understood as processes, the length of engagement determines the scope of possibilities. For example, an average player can finish *Shenmue II* in about 30 hours. This period is sufficient for integration of navigation commands into muscle memory, absorption of

paths to game destinations into a ready-at-hand topology and learning of the game mechanics. By contrast, players stay in *Star Wars Galaxies* much longer, often for months and even years. The longer timeframe permits other types of engagements and learning. For example, players organise in guilds, develop long-term relationships and invest time in learning sophisticated in-game professions. Thus, it is meaningful to speak not only of temporal states of places but also of their duration as encountered by their participants.

During *The Parasite* project we wanted to influence the way people thought about architectural design. In this case, typical museum visitors, people who purchase tickets, arrive with little familiarity with the exhibition, no information on specific exhibits and stay for no longer than one or two hours, benefited the least. According to my observations, such a typical visitor spent less than five minutes attending our installation in the stairwell. Five minutes per installation is common for other exhibitions and was usual for the other works at the Biennale. Visitors often passed the static works, such as sculptures or painting even more quickly.

Our mode of work extended the engagement of the museum visitors with the installation. Understanding the installation as a dynamic performance of construction rather than as a static sculpture helped us to fill the museum with *The Parasite*'s performance in a more powerful way than a complete, punctualised artefact ever could. As the visitors moved through the museum, they encountered patches of the *The Parasite*'s shells exhibited in multiple locations and contexts, variously lit, blocking paths, visually surprising and often in the process of assembly. Thus, the construction process and the incompleteness of *The Parasite* drew the attention of the visitors and provided multiple distributed encounters. Visitors who were able to observe the construction work taking place during two weeks after opening received an additional insight. Apart from attending the audio-visual spectacle, they were able to appreciate the scale of the project, observe the enthusiasm of the builders and learn about the construction process. Yet, even taking into account these extended exposures, a typical visitor's contact with *The Parasite* was very short. Thirty minutes or

one hour and the visitor moved on to the other halls or away from the museum. Visitors attending several evening performances could have recurring contacts with the installation but their combined exposure to the project remained brief and comparatively superficial.

By contrast, many of our collaborators spent much longer with the project. Through their involvement, they were able to gain access to explicit and tacit knowing, engage in a variety of practical and emotional relationships, come into conflicts and rejoice at their achievements, show generosity and suffer from disorganisation, make friendships and decorate their curricula vitae. Consequently, I suggest that relationships made evident and enabled by the processual understanding of place are beneficial for collaborative learning that is essential for place-making.

As designers, we worked on the project longest and changed the most through our engagement with it: we learnt new techniques, gained emotional experiences, acquired new contacts and formulated new ideas. I suggest considering people involved in the making as legitimate beneficiaries of architectural projects, especially if design and construction emphasise the fluid character of places and are open for broad participation.

Multiple modes of extended participation triggered by *The Parasite* highlighted the value of enacted, temporal performance for sharing of drama, knowing and experiences of places. While all architectural design necessarily participates in such performances, I suggest that conceptual recognition of the dynamic, fluid character of places afford extra opportunities by focusing designers' attention on the otherwise unobvious performative engagements. Awareness of the existence of such engagement is the first step towards the development of targeted strategies for their utilisation in place-making.

III.2.4 Negotiated places

As a socially-constructed phenomena, places assemble through continuous negotiations between actants. As Latour (2005, p. 34) points out, "social aggregates are not the object of an ostensive definition—like mugs and cats and chairs that can be pointed at by the index

finger—but only of a performative definition." Other contemporary social-theories have expressed similar ideas. Thus, Elias (1978, 1982) developed the concepts of "figurations" or patterns of actions and relationships enacted by groups of people.

> One should think of a mazurka, a minuet, a polonaise, a tango, or rock 'n' roll. The image of the mobile figurations of interdependent people on a dance floor perhaps makes it easier to imagine states, cities, families and capitalist, communist and feudal systems as figurations. By using this concept, we can eliminate the antithesis, resting finally on different values and ideals, imminent today in the use of the words "individual" and "society". One can certainly speak of a dance in general, but no-one will imagine a dance as a structure outside the individual or as a mere abstraction. The same dance figurations can certainly be danced by different people; but without a plurality of reciprocally oriented and dependent individuals, there is no dance. Like every other social figuration, a dance figuration is relatively independent of the specific individuals forming it here and now, but not of individuals as such. It would be absurd to say that dances are mental constructions abstracted from observations of individuals considered separately. The same applies to all other figurations. (Elias, 1978, p. 262)

Similarly, Giddens (1984, p. 377) uses the term "structure" to mean "[r]ules and resources, recursively implicated in the reproduction of social systems. Structure exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action." Bourdieu's (1977, p. 72, also, see 1984) "habitus" also emerges from such low-level encounters as

> systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and representations which can be objectively "regulated" and "regular" without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor.

In a related argument, Mitchell (2000, p. 136) insists, "landscapes are always a site of struggle, a place for resistance, and a concretization of contest." I suggest that places also have a contested character that emerges from local negotiations.

When architectural designers engage with a place, they generate

inscriptions specifying who is to take part, the setting for the performance and the relationships between actants, yet if some of the actants do not play their parts as prescribed, the desired performance does not materialise. Therefore, architects' role in the place-making process is always that of campaigners seeking support from multiple human and non-human allies. Bijker (2005) provides an illustrative example of such negotiated becoming in his discussion of how political and ecological issues influenced design and realisation of a major flood-protection barrier.

Even though the view of heterogeneous participants in places as partners in a dialogue is unusual in architecture, the mainstream architectural discourse confirms that negotiation and campaigning are part of design practice. Enacting dialogical involvements, architects, developers, engineers, politicians and others routinely act as self-appointed representatives for cities, districts, buildings, historical centres, squares, roads, rivers and forests. Architectural practice provides an abundance of characteristic examples of such activities often characterised by emotive language. For example, Tate Modern's press material (Tate Modern, 2006) stated that its extension, designed by Herzog and de Meuron, would "create a new landmark building for London, which will help it to maintain its position as the leading cultural and creative capital of the world." The document presented "London" as an actant whose role is to "maintain position". Similarly, the document claimed that the "new project" would "act as a catalyst for the further regeneration of Southwark. The new building will facilitate the greater integration of Tate with its local community and urban landscape, bringing maximum benefit to the local area." This statement announced a whole range of actants: the "new building" that had to "act as a catalyst", "facilitate the greater integration" and "bring maximum benefit"; "Southwark" that had to regenerate; "Tate" that had to integrate with the "local community" and "urban landscape" and the "local area" that received the "maximum benefit". This language illustrates how architects strive to form persuasive alliances with a variety of existing, socially-constructed or newly-formed rhetorical entities depicted as the primary actants in an environment.

The dependence of place-making on successful negotiations was also evident in my case-studies. Characteristically, *The Parasite*'s success-stories reflect achievements in the distribution of authorship. Many people came to feel ownership over the project and responsibility for it. Because of their direct involvement, they were willing to contribute much more than what the exhibition support-staff or even the hired labourers could offer. On the other hand, truncated design-efforts such as the failure to complete the physical structure as designed or the inability to retrieve the installation and the prefabricated parts for further use resulted from the problems of communication between participating parties.

For example, during early negotiations, we agreed with the curator and the organisers on the stairwell as the hosting site for *The Parasite* installation. However, in spite of this early and documented agreement, we had to renegotiate the meaning of the hosting site, its location in the museum and its relationship to the other related places many times throughout the project. Even when leaving England with the pre-produced cell elements designed to fit into the stairwell, we were not sure we would be able to use it. Subsequent meetings with the other participants confirmed that there was no single reason for this uncertainty. Different stakeholders variously saw the stairwell as an important circulation route, a fire-escape path, an un-restored leftover of a major fire or a preferred installation site. Each of these forms implied particular prescriptions and affordances. Most of the participants tried to educate each other about their disparate realities. However, their different habituses, tight scheduling and constrained communication made the negotiations difficult.

During *The Parasite* project, the co-presence of multiple worldviews and languages necessitated various performances of translation as is also typical in other negotiations between heterogeneous actants. The organisers of the International Biennale of Contemporary Art set out to produce an artistically meaningful event. Their team included an architect and many people with background in fine arts. Yet, we could mobilise the organisers only by speaking the languages of safety and feasibility. Our communication consisted of

struggles for credibility, information, money, devices and work force. Artistic or research considerations were of no bargaining value in this dialogue. The organisers delegated artistic judgement to section curators and busied themselves with the practicalities of management. On the other hand, discussing the project with the members of our design and construction team in terms of accounting, logistics or local politics was counterproductive and often impossible. Instead, we could inspire this group by the novelty and originality of our creative ideas or by the emotional and practical rewards of collaboration and comradeship. Examples of translations in *The Parasite* project included: <human>—<computer>; <three-dimensional model>—<two-dimensional model>—<machine operator>—<laser-cutting machine>; <English>—<Czech>; <Windows XP>—<MacOS>; <Rhino>—<Maya>; <artist>—<organiser>—<volunteer>—<technical worker>; <stairwell>—<three-dimensional model>—<paper sketch>; and <scaffold builder>—<artist>—<installation>—<exhibition visitor>.

Parallel, compatible meanings of places also can persevere only through the success of continuing re-negotiations. When participants disagree strongly, the meanings diverge and the effect of shared place dissipates. For example, during the early stages of *The Parasite's* construction, our team occupied an area in the main exhibition hall. This area was in the middle of the hall and large, in comparison to the areas occupied by other artworks. The organisers, in-house architects and other artists all agreed, explicitly or silently, that this area was a "construction site" of *The Parasite* installation. However, as the opening day was approaching, traces of other construction work disappeared from the halls. Finally, when two other artists completed an expensive and, they argued, fragile installation nearby, the compromise collapsed. Whatever tipped the negotiated balance, at some point the organisers told us that this area was now an "exhibition space" and that all construction there had to stop. An area of the hall ceased to exist as a stage for the performance of making. Our team vanished as actors and became builders. Even though the core process of technical construction remained, together with the change of roles came the

new rules of behaviour and rights of access.

During the process of negotiated place-making, actants need to construct on demand, expose, defend and rebuild multiple, speculative versions of situations, performances and each other. This imaginative storytelling lies in the foundation of team building and is necessary for collaborative place-making.

The Parasite project is a good illustration of how participants establish initial relationships and begin negotiations that lead to the emergence of places. I include this example here to emphasise the distributed, negotiated character of places but these place-making negotiations are also relevant to the subsequent discussion on the distributed nature of the creative processes that can lead to the emergence of places.[1]

My conscious involvement with *The Parasite* project began when I met the curator for the Performative Space section for the International Biennale of Contemporary Art in Prague. He invited our studio to contribute a pavilion showing performance-related work. In our conversation, the first, hazy forms of a possible future place began emerging. We thought of this future place and the process necessary for its becoming as one project. Even at this early stage, we had to consider this project in reference to the, largely imagined, expectations and compatibilities of future participants ranging from organisers, to the ticket-buying public and from online information-spaces to exhibition halls.

Simultaneously, organisers and curators attempted to imagine the places of their event by imagining their future artists and their possible projects. Thus, as artists, we became addressees to which organisers directed background information on the Biennale, promotional material describing the Performative Space section and preliminary assurances of material support.

The organiser's materials presented an attractive project opportunity and I invited a colleague to collaborate. During our initial conversation, I had to convince him that the project was worthwhile. I knew little about the Biennale or our curator and had to imagine and out-

1. See the section on Distributed Creativity (p. 170)



Fig.36. *Klütterkammer.* Installation access-area. (movie frames)

line the possibilities of the project based on my previous experience and an estimation of possible common-interests. In preparation, I imagined my collaborator as my audience and attempted to shape my story for him as convincingly as I could.

Our consultation was simultaneously a social engagement, a brainstorming session, a design act, a struggle of wills and a performance. His role in this encounter was simultaneously or intermittently that of an opponent and supporter, collaborator and sceptic, orator and listener. As a performative experiment-in-practice, this consultation uncovered and provoked opinions, verified responses to ideas, encouraged learning and readiness for action. An important result of this performative encounter was a transformation through which we became collaborators, retaining our differences but sharing a loosely negotiated basis for further action.

During our consultation, we agreed that we needed to know more about the Biennale and the organisers in order to come to conclusions. This need for information triggered another transformation. United, we turned to the Internet in search of published materials on the organisers, on the event itself and on our curator. The scarcity and inconsistency of publicly available information lead us to hesitate about the size of our contribution, the immediate practical steps and even the very fact of our participation. This search for background information cast us in the roles of addressees of the organisers' generic efforts. At the same time, the scarcity of information encouraged us to consider the nature of exhibition organisation and forced us to search for constructive ways of dealing with a broad range of participants.

Developing our engagement, we formulated a proposal and presented it to the director of our research studio. Again, the appearance of a new addressee required a re-making of the project's narrative. This new audience-shift triggered another cycle of research, re-design and re-negotiation. We knew that as a director our addressee wanted to promote the studio and its work and to see the project develop as research. He was also in control of financial and material resources that we were hoping to utilise. Our preparation and presentation had



Fig. 37. *Klütterkammer.* **Arrival. A group of visitors arrive to see the installation. While some are already climbing up and looking inside, others stop to observe and evaluate the situation. (movie frames)**

to respond to these new expectations.

Yet another change of an addressee occurred when we compiled a proposal for the organisers of the Biennale responding to their interests and concerns as we understood them from the background information and initial contacts. From this moment on, the process of role-shifting, idea trading, efforts to imagine the others and translate the ideas for them continued throughout the project. This place-making process combined into one continuous, multiplicious and negotiatory engagement phenomena that conventional descriptions recognise as separate performances: 1) familiarisation with places, such as those of the city and the building hosting the Biennale; 2) designing of places, such as that of the installation; 3) inhabiting of places, such as those of our department. By emphasising the negotiated character of place-making, this example suggests that places are not passive entities existing independently from their participants or coherent wholes emerging in a complete form in the minds of their creators. Instead, this example of highlights multiple, probing exchanges between participants and shows that the processes of discursive processes of shared learning and imagining are integral to places.

This section suggested that places exist through continuous re-negotiation that brings together multiple participants. This understanding has interesting implications. For example, the never-ending dynamic renegotiation of places blurs the boundaries between imagining, designing or making on one hand and inhabiting, dwelling, or narrating on the other. It becomes more difficult to speak about emergence, existence and disappearance of places in general. Instead, it appears more meaningful to discuss this temporal phenomena in relationship to particular participants or groups of participants. The contested character of place-making and place-sustaining negotiations also suggest that it is difficult to propose a general description of what is a place or what are its characteristics in any one moment of time. Instead, all stakeholders, including designers and other experts, can discuss characteristics of places in relationship to their own personae and situations or in relationship to other participants. No stable, abstract and general opinions on places are possible.



Fig.38. *Klütterkammer.* One of the entrance ducts. The image shows a temporary, improvised storage-place of visitors' coats and bags. (location photograph)









Fig.39. *Klütterkammer.* Deliberations. As one man climbs into a duct, another, at the bottom of the screen, can be seen exploring the challenge as his companions look on. (movie frames)

III.2.5 Expressive places

The understanding of places as hybrid, multiplicious, fluid and negotiated is compatible with the idea of expressive and dramatic places. Places can express existing relationships, variously frame ongoing performances or invite particular behaviours by situating and conditioning social interaction. The *Klütterkammer* exhibition provided many examples of engagements that exhibited expressive and dramatic potentials of places and this section contains observational examples highlighting the affordances of places brought forth via the application of the performative-place approach.

The lower ground-floor of the Institute of Contemporary Art hosted one of the possible entrances to the *Klütterkammer* exhibition—a wall with several openings extending across the building's lobby (fig. 36, p. 145; fig. 37, previous page; fig. 38, this page fig. 39, this page; and fig. 41, next page).

The structure of the wall decomposed the habitual, punctualised, form of entrance. The surface of the wall was opaque and the narrow ducts of openings did not allow visitors to see what was behind (fig. 38, this page). The ducts challenged visitors physically and socially by requiring them to leopard-crawl and thus, converting the wall into a stage for the rituals of admission and initiation or, for some visitors,



Fig. 40. *Klütterkammer.* **The Institute of Contemporary Arts foyer as seen from one of the entrance/exit ducts. The image demonstrates the contrast between the lively and customary situation in the foyer and the extraordinary circumstances of the experient. (photograph)**

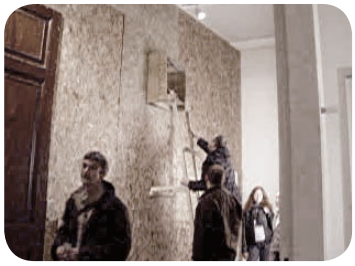








Fig. 41. *Klütterkammer.* **Entrance. The two men from the first group decided to move in. They are openly watched by two women with whom they are not acquainted. When the men complete their entrance the women follow. (movie frames)**

for example the disabled, into an excluding barrier.

The wall did not have instructions for usage. In this area and everywhere in the exhibition, people spoke loudly, moved freely, bent, squatted and touched parts of the installation with no apparent respect for the rules of customary museum-behaviour. The new arrivals presumed that this unusual behaviour was welcome because the place expressed an invitation for an open and creative play through its rough, in-use appearance and the suggestive behaviour of already-engaged human participants.

The wall stood next to the lively foyer. Accessible via the main entrance, this foyer received all visitors to the Institute of Contemporary Arts. It housed information boards, ticket stalls, a bookshop and a meeting area. From this foyer, visitors could proceed to the cinema theaters, exhibition halls, café rooms and other destinations. The sounds and movement in the foyer catalysed the energetic mood shared by people in the *Klütterkammer's* entrance area. In addition, the bright light and the lively atmosphere of the foyer also sharply contrasted with the experiences of the *Klütterkammer's* inner locations (fig. 40, this page). The confined arrival zone in front of the wall forced the visitors close together. This location caused an impression of an intimate gathering because all could hear the words of warning



Fig. 42. *Klütterkammer.* Play of light and shadow inside the hay room. The image shows a circular opening and a ladder leading to the lower level. Bits of straw on the floor and the scrached surfaces of the ladder demonstrate the in-use appearance of the *Klütterkammer* places. (photograph)



Fig. 44. *Klütterkammer.* The bridge, or an open duct, made of loosely fitting wooden planks leads to the translucent plastic room. (photograph)



Fig. 43. *Klütterkammer.* This view from a bridge shows four contrasting rooms—hay, translucent, mirror-walled and transparent—built at the far wall. Several ducts link them with the other rooms at the entrance area. The image demonstrates a variety of rough surfaces and materials used. (photograph)

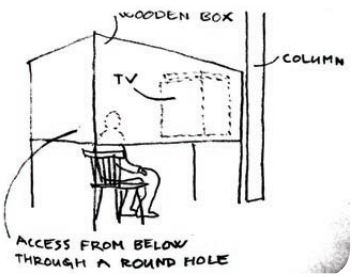


Fig. 45. *Klütterkammer.* Video installation [1]. The sketch shows the internal layout of the installation. (on-location sketch)



Fig. 46. *Klütterkammer.* The Institute of Contemporary Art corridor with a row of installations. The foreground shows installation [1] with its under-surface cut-out, the chair and the reflected light of the movie. The box is empty. (photograph)

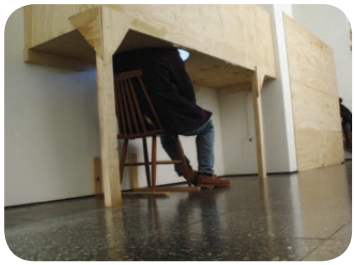


Fig. 47. *Klütterkammer.* The Institute of Contemporary Art corridor, installation [1]. The visitor is watching the movie. (photograph)

or encouragement exchanged between acquaintances. In spite of the enforced physical closeness, the visitors had plentiful opportunities to observe each other's behaviour. Many prepared for the moment of entry by engaging in several stages of observation. For example, people watched discreetly from the foyer, then came closer and stood at the stairs serving as a threshold of the arrival zone, leaned against a wall or even squatted on the floor. Many visitors stayed in these anteareas for prolonged periods, often exceeding several minutes, watching the others, peeping into the ducts, touching the surfaces, and exchanging remarks with friends and strangers.

The ducts were too narrow for the bulky clothes or bags and the visitors left them in a pile on the floor (e.g., as in fig. 38, p. 147) under the guard of an invigilator. Depositing and retrieving clothes and bags caused angst as many worried about leaving their possessions in a vulnerable place and necessitated further social interaction and assurances from invigilators. One invigilator sat next to a door, now and then responding to questions or giving advice, indicating that silence was not enforced. The plywood surfaces of the installation looked rough, the ladders, ducts and the door—used. The place invited tactile engagement and the visitors readily followed.

Through their performances, actants in places influence each other as they participate in the construction of places. Facing an unusual



Fig. 48. *Klütterkammer.* One of the ducts with a circular cut-out in the right wall and the spot of light penetrating the cut-out on the left. The hay pavilion is visible at the end of the duct. It suggests further spaces beyond and serves as a ground for the sudden appearances of other exploring visitors. The size of the duct is enough to fit one person crawling. (photograph)



Fig. 49. *Klütterkammer.* The same duct seen in the opposite direction and with a person moving through. Performative topology of the geometry, lighting and mood all change suddenly through the presence and actions of another participant. (photograph)

entrance, many people decided to observe the others first and often changed their behaviour dramatically after these observations. Non-human actants also provide performative guidance. For example, in many places people would be unlikely to notice unmarked plywood structures used during the *Klütterkammer* exhibition. However, situated in an Institute of Contemporary Art, they called for attention. Within an art institution, the look and sound of the structures did not accumulate into a known, punctualised entity. Incomprehensible and incongruous, they triggered in the visitors simultaneous curiosity



Fig.50. *Klütterkammer.* A duct with sacks. On the right, there is an image projection and a light shape defined by a cut-out in the wall on the left. (photograph)

and anxiety inviting exploration and reflection.

Frame analysis describes similar engagements as keying, where the key is "the set of conventions by which a given activity, one already meaningful in terms of some primary framework, is transformed into something patterned on this activity but seen by the participants to be something quite else." (Goffman, 1986, p. 42) For example in theatre, attendees perform interpretive acts, transporting the props, bodies and actions into another, hypothetical world with a set of meanings that they do not fully know but understand to be different from the everyday world that surrounds them. Theatrical events including arrival rituals, dress code, architecture of the theatre and stage lighting invite such transportation. Similar framing-performances take place in non-theatrical places. For example, an imposing museum building vouched for high culture, demanded that people spoke in hushed tones and classed as art the mess of *The Parasite*'s building site. For *A Warning for the Curious*, the involvement of the college gates, the gowned porters and the neat lawns of King's College demanded the impossibility of orderly behaviour from participants of an exploratory game. During a public presentation of *Virtual West Cambridge*, the spacious bay, the stall with a poster, the size of the video projection set amongst other exhibits in a recently completed,

architecturally flamboyant building demanded from a passing visitor the seriousness towards a game-like world.

In another encounter during the *Klütterkammer* exhibition, I observed how a man approached one of the plywood boxes, looked it over but seeing no instructions bent down and looked underneath where stood a wooden chair. A common punctualised object, the chair broadcasted an invitation to sit down. Yet, at the first glance, the shape of the box did not provide enough room for a sitting person (fig. 45, p. 150). The man seemed committed to the appreciation of art and looked for a way to resolve this conflict of perceived affordances. He bent further down and saw that the bottom surface of the box had an opening (fig. 46, p. 150 and fig. 47, p. 150). After a brief hesitation, the man moved under the box to look into the cut-out. He must have found the interior interesting because he made an effort to lower his body into the narrow gap between the chair and the box, twisted his torso in through the cut-out and, eventually, sat straight on the chair. Thus, in a very brief encounter, the man subscribed to a program incorporated into the material structure of the installation. The designer succeeded in staging a mini-performance enacted by a stranger by utilising a combination of the familiar and the provocatively incongruous.

The emotional, dramatic tension staged by the exhibition layout and the affordances of the box questioned the implicit norms of behaviour and forced visitors to make a consequential and public choice of action. For example, in a moment when the plywood box and the chair were empty, I observed a middle-aged couple approaching it with surprise and hesitation. The woman bent a little trying to see under the surface but not enough to succeed. The man waited three steps behind with what seemed to be disapproval of her inquisitiveness. The couple moved on past two other unoccupied niches that offered unobstructed access to their installations and, disregarding the apparent inconvenience, came to a stop at one that was busy. They stayed there for a while watching a movie over the shoulders of others.

The couple selected the movie not because of its content—their

audible remarks about it were disparaging—but because of the emotional comfort it provided in comparison to the other choices. As my observations suggested, the couple were diligent visitors who seemed committed to seeing the exhibition exhaustively. However, the box in the first niche looked rugged, its use was unclear and the effort required to sit down on the chair was threatening to their dignity. Nobody occupied the next two niches but they also required unusual efforts, such as climbing and crawling, to reach the video shown inside. A small crowd obstructed the last niche but it had a video reachable with a conventional effort of shoulder-rubbing and no need for self-exposure in a solo effort. These two brief encounters demonstrated how participants can see different affordances in an identical physical set-up and how the differences in their experiential places result in the development of diverging and emotionally potent narratives.

The examples above illustrated the mechanism of individual place-construction and emphasised the differences in personal interpretations. The resulting diversity of engagements with situations has a capacity of encouraging participants into distinct dramatic and narrative roles. These dynamically engaging and contingent modes of participation suggest kinaesthetic, analytical and emotional complexity that extends beyond the meanings encompassed by the concept of usage. Relationships between actants resembling those emerging in narrative and drama can better describe such encounters.

For example, places of the *Klütterkammer* exhibition routinely converted visitors into active performers. Having observed the plywood box in the first niche for about an hour, I got up, approached and with an effort slid in under the box and onto the chair (fig. 45, p. 150 and fig. 47, p. 150). Inside, a video monitor filled the short end of the box. The dizzying video showed a young man driving a large agricultural tractor on a barren field. The camerawork was hectic with many sudden close-ups. As the movie scenes rushed by, I felt as if the monitor was a windscreen of a purposelessly moving vehicle.

Before I entered the box, I thought that the movie was the meaningful core of the installation. Now I discovered that the movie was a puzzling and underwhelming reward for the effort. Instead, the instal-

lation cast me as a performer and attracted my attention to the particulars of the movie-watching experience that it staged. Rather than functioning as the meaningful core benefiting from a muted background, as it is common in the traditional cinema, the movie acted as bait. It contributed to the collaborative, situated performance with its soundscape and the flickering light emanating from the video monitors more than with the narrative capacity of its images.

The unusual preparation and its absurd resolution problematized my habitual behaviour. When I was watching the movie, two thirds of my body was protruding out of the box. The walls of the box concealed the surroundings and the loud sound of the video, reflecting in the confines of the box, overpowered the conversations of other visitors. I was acutely aware that people could be passing by, looking at me, commenting on my comical headless appearance or waiting for their turn. I wanted to look confident and wondered how my pose and movement looked from the outside. I cared more about the ritual of viewing than about the movie. The installation made me made aware of the social risks and I felt stage fright.

The *Klütterkammer* boxes complicated the typical relationship between spectators and the screen. While a typical cinema or theatre attempts to minimise interference, the *Klütterkammer* boxes highlighted relationships between the media and the surrounding place. In the process, the viewing place became emphasised as a stage where participants came into contact, hassled for positions and coped with challenges to their social status.

Such dramatic encounters can give new or redefine existing meanings of architectural structures thus creating new forms of places. The *Klütterkammer* exhibition provided multiple examples of performative topologies or in-experience, subjective constructions of place. For example, after passing through the entrance area of *Klütterkammer*, I climbed up the ladder and into a duct. A brief crawl took me into a cubic room where music played. In there, I found a narrow opening into another room, a square hole in the floor with a ladder under it and a mouth of another duct. There was a picture on the wall and a sculpture in the corner. I felt aware of an invigilator sitting on the

floor and watching my actions. I hesitated briefly and decided to go with what I felt I knew already—another duct. The stress of being in an unfamiliar and counter-intuitive environment and the presence of the judging observer motivated my decision. The brevity and intensity of my encounters influenced the subjective place that I was co-constructing. The duct that I chose was narrow, long and murky. I did not know where it led. Someone was already in it behind me and I felt that I had to keep moving. Again, a performative situation modified the subjective topology of the environment. Through the participation of the other visitors moving behind me, the duct acquired direction, lost the access to the room behind and gained the temporary capability to induce speed.

Another encounter in the ducts of *Klütterkammer* illustrated the role of media as an attractor and the other human participants as topology modifiers. It began in one of the lower-level ducts that was full of soft, stuffed sacks hanging along the walls (fig. 50, p. 152). I had to crawl among them to move on. The presence of the sacks constrained my vision and set up a suspenseful situation because remembering my previous experiences in *Klütterkammer*, I expected to find something interesting behind them. The duct darkened and two other people appeared from a joining duct. I let them pass. Among the sacks, built into a wall, there was a video monitor (in other cases, paintings, sculptures or projectors, as in fig. 50, p. 152, played the role of such attractors). Someone was at it, already watching a film. There was no place for another person to join and it would be too difficult to pass. Therefore, I turned away into another duct succumbing to a temporary condition created by a co-performance of human and non-human participants. These encounters are similar to various events that are also common in everyday life where the accessibility, speed and direction of movement change with the performance of other actants.

Architectural structures can stage dramatic encounters that redefine meanings of a recognisable architectural feature or a location in response to a particular temporary performance. This flexibility in interpretation of physical conditions afford multiple interpretations

and accrual of meaning that can generate interest, result in suspense and can create dramatic tension thus providing the basic elements for the development of narrative encounters. My encounters with circular cut-outs that appeared in several places in *Klütterkammer* provide examples of contrasting and cumulative dramatic roles enacted by near-identical physical entities. I saw the first of such cut-outs when I encountered a bright circle on the wall of a duct (fig. 48, p. 151). The light shined through the cut-out and made the twin circle on the opposing wall. I approached, stepped into the beam of light and looked out through the cut-out into the hall.

The cut-out led me to expect a good vantage point in a visually and kinaesthetically restricted environment. I also appreciated the sculptural quality of the cut-out with its interesting light effects. After this encounter, I thought that duct cut-outs—if indeed there were more than one—were benign, passive and created for my use and benefit.

The next duct had a projection on the wall and I moved closer to explore. Just before I reached the projection, I noticed another circular cut-out in the opposing wall and stopped to look through it only to come, nose-to-nose, with a woman's face. This encounter dispelled my impression of a cut-out as a utility feature. As I was looking out, the woman was trying to see what was inside. The sudden encounter startled us both. We both felt self-conscious. She was standing in an apparent position of dominance as I was on all fours, looking up. She was in the light and I was in the dark. With my body hidden, I felt that the duct protected me but I also knew that my face was un-shadowed making me feel exposed. I was conscious that I looked strange appearing in the cut-out and, accustomed to the dark interior, I could not see well in the bright light. The near-blindness made me feel helpless but also gave an excuse to put on a mask—a grimace meaning to say: "oh, it's bright here!". I also interpreted my position as "inside" and the woman's as "outside". Consequently, I felt myself a host and derived strength from this sensation. Conversation seemed unbearable but it was also impossible to ignore each other. We did not do much, only chuckled, apologised and moved on. However, I settled to watch the projected movie mindful of the immediate outside, separated by a

thin layer of plywood and wary of the cut-outs.

To conclude, places can help participants reflect on how they frame their situations, thus making structure and function of place-performances more open and accountable. For example, *Klütterkammer* drew my attention to propagandistic and humourless qualities in conventional "this-is-art" framing. I became emotionally aware of the unwritten rules that govern behaviour in museums and to which I would typically comply without thought or challenge.

Places also can make participants invest effort thus deepening involvement, contributing to engagement and facilitating tacit, experiential learning. For example, *Klütterkammer* made people act with their bodies, exposing the passivity of conventional viewing and eroding the boundaries between art and spectators. Visitors had to spend emotional, intellectual or physical effort to move and see the exhibition. In my experience, these expenditures made the exhibition more engaging and memorable.

While in describing the *Klütterkammer,* I have utilised an example of an environment intended as art, I insist that all places involve expressive performances. The *Klütterkammer* is useful because its expressive impact is particularly powerful. However, even in this characteristic case, the expressive effects are far from self-evident. Many of my interpretations of the *Klütterkammer* could only emerge through purposeful participatory-observation and careful analysis. Participants of everyday places have opportunities to notice expressive place-performances less frequently and the equivalent effects in such places can be considerably more subtle.

However, the subtlety or invisibility of place-performances does not negate their omnipresent significance. Without its performance, a building is just a collection of peculiarly formed bits of material. Stonehenge is an example of such a structure without its original program and associated performance. Since its re-discovery, new performances related to tourism, academia or religion have given it new meanings and its contemporary visitors do not have access to its original inscriptions. Taking into account the dynamic, fluid and constructed character of places, I suggest that architecture can usefully

understand places as performances that are products of ongoing participations.

III.3 PLACE-MAKING

In this section, building upon an understanding of place as performance and accepting that the architectural profession can continue contributing to the making of new types of places, I consider the possible characteristics of architectural place-making processes.

In the previous section, I argued that places are social constructions that are relational, fluid, multiplicious, negotiated and expressive. This understanding does not permit unilateral production of completed, static, universally understood entities because all entities are socially constructed and subjective. Multi-modal communication and translation tie these dynamic places together. Without successful communication, cooperation in place-making is impossible. Therefore, an important function of architectural design is in encouraging, provoking and maintaining relationships between participants. This perspective casts artefacts and structures as enablers of intellectual and emotional exchange rather than as outcomes of design.

Architects and designers have always engaged in social performances and the architectural profession retains much expertise that is directly useful in relationship-making pursuits. However, the common rhetoric of architectural design tends to prioritise material and functional outputs. Where buildings serve as acknowledged symbols, the discourse typically imagines that their meaning is a static construction of the leading designer. This traditional attitude to design as an artist's exercise of talent or a functionalist's pursuit of efficiency fails to highlight the challenges and opportunities that can help architectural practitioners contribute to performative places. The performative-place approach, suggested in this thesis, provides a re-conceptualized way of looking at architectural design that allows practitioners and academics to refocus creative attention and contributes a template for a new vocabulary of place-making.

The social meaning of architectural form is often little to do with

tectonics or efficiencies. Public attention attracted by such designs as the Guggenheim Museum in Bilbao shows the power of design in reconfiguring complex and wide-reaching social situations. While the Baroque-like excesses of this project attract displeasure of architects committed to the harmony of minimal sufficiency, the performative-place approach recognises their usefulness as a provocative spectacle. As many proponents of "creative cities" in development studies convincingly argue, places increasingly need to appear attractive or fashionable to be viable and economically successful (Florida, 2005a, 2005b; Milestone, 2007).

Mitchell (2003, p. 162) argued that

> [t]he key instrument of the traditional spatial organization strategy was the written architectural program—a detailed list of required spaces, specifying floor areas, technical requirements, and adjacency needs. [...] But the architecture of the twenty-first century can (if we choose to take the opportunity) be far less about responding to such rigid programs and much more about creating flexible, diverse, humane habitats for electronically supported nomadic occupation.

I suggest that the task of creating such flexible habitats is the task of discovering and engaging with multiple disagreeing stakeholders explicitly or potentially linked to an architectural project.

Architects cannot build places because they only grow via wide-ranging participatory action. Architects can only encourage their emergence. The task of learning about and coordinating performances of multiple stakeholders requires that the focus of architectural designing shifts from the design of artefacts to the consideration of processes, from the search for authenticity towards the acceptance of multiplicity, from the search for harmony toward the acceptance of chaos, from the strive for longevity towards the acceptance of permanent change and from the focus on artistic expression to community building. As Habraken (1998, p. 327) insists, "[t]he idea that a living environment can be invented is outmoded: environment must be cultivated."

Other areas of designing have developed working practices that incorporate some of these characteristics. For example, development of persistent online environments, such as massively-multiplayer

online-games, relies on the contributions from diverse participants and depends on community building. Design teams begin online consultation and collaboration with potential players long before opening access to their online games. After the initial launch, the consultation process continues as designers keep readjusting emerging places in response to feedback. In parallel, players also contribute to place-making by creating and owning in-game content. This type of development is characteristic of such worlds as *Star Wars Galaxies* (*Star Wars Galaxies*: An Empire Divided (PC (Win)). USA Release, 2003), World of Warcraft (World of Warcraft (PC (Win)). 2004) and other titles. For example, developers launched the *Star Wars Galaxies* website long before the game. Development of the site helped to foster the community of players and allowed them to contribute suggestions to the game. Players were able to contribute to the design of the environment they felt passionate about and the developers benefited from the ideas and free work of a large community. Players were involved in play-testing, debugging and pre-production. The designers assumed the role of initiators who triggered the development cycle. By contrast, secretive design-processes, common because of commercial and copyright concerns, make it difficult to seek allies and can lead to exclusion of stakeholders.

In spite of the dynamism and multiplicity characteristic to places, it is customary for human actants to think that in their encounters they are dealing with singular, well-defined entities. In commercial settings, designers typically strive towards closure that emphasises one dominant inscription and suppresses alternative engagements. However, this approach is not the only one possible. Design practice can also have other meaningful goals apart from the drive towards closure. Some architects deliberately set out to provoke the existing social field. In doing so, they do not seek to impose a preferred punctualisation and achieve closure and I suggest that architecture needs to cultivate approaches that can accommodate the dynamism of consensus in stabilised places. The acceptance of stability as perpetuation of negotiation opens the way for restructuring architectural-design workflows. This position affects goals, flow and criteria of profession-

al place-making practices, shifting the value from the production of material artefacts such as buildings to the staging and supporting of ongoing performances.

In order to be able to cope with the new challenges of place-making, architects need to develop techniques that can help to recognise the fluid character of places and use the properties of this condition to inform design. Information-technology designers have become increasingly aware of a similar need. For example, Brown and O'Hara (2003), Ciolfi (2005), Ciolfi at al. (2006) or Kakihara and Sørensen (2002) discuss place-related mobility and have suggested that designers should be aware of spatial mobility (where), temporal mobility (when) and contextual mobility (in what circumstances and towards which actants).

The performative-place approach necessitates an understanding of the design process in terms of temporal as well as material boundaries. These boundaries need to include performances beyond those conventionally considered as the legitimate core of professional design-process and be flexible enough to take into account the fluid character of places.

As assemblies of many simultaneous and overlapping processes, places are endless. However, human experiences have beginnings, middles and ends. As Pred (1984) suggested, people, other living creatures, natural phenomena and objects have "biographies" that occur as paths in space-time.

> [T]he biography of a person can be conceptualized as a continuous path through time-space, subject to various types of constraint. The "biographies" of other living creatures, natural phenomena, and humanly made objects can also be conceptualized in the same manner. A project consists of the entire series of tasks necessary to complete any intention-inspired or goal-oriented behavior. Each of the sequential tasks in a short- or long-term project is synonymous with the coupling together in time and space of the paths of two or more people or of those persons and tangible resources, such as buildings, furniture, machinery, and raw materials. (Pred, 1984, p. 281)

Because humans operate in congested and bounded fields—from the confines of the planet to those of a town or a workplace—convergence of some paths implies divergence of other paths. This observa-

tion also holds in reverse—the divergence of paths and dissolution of one project necessarily means convergence of some other paths and the potential formation of other new projects. An end is also always a beginning.

This temporal notion of a project suggests a new way of thinking about the confines of architectural engagements. These engagements can extend beyond beginnings and ends of traditional professional design-engagements to include, as heating-up periods, such activities as ethnography or community-building and, as cooling-down stages, usage studies, servicing, disassembly and recycling.

Throughout this extended process, architects need to find ways to encourage wide participation and to maintain their usefulness and stature in broadly collaborative design-situations. In multidisciplinary teams necessary to tackle most contemporary design challenges, architecture does not have an automatically privileged role. Architects need to find ways to convince their collaborators that their expert efforts are meaningful, diligent and valuable.

In pursuit of this goal, I suggest an approach that acknowledges dialogical, reactive and emergent characteristics of design process. This understanding of design can encourage reflective practices and open negotiations that avoid hasty, uncritical or distortive decisions suggested by the momentum of practice, arbitrarily imposed by overarching theories or uncritically compliant with the existing institutions of power. Similarly, Stengers (2005, p. 1002) proposed to "slow down" reasoning so that design thinking could proceed "'in the presence of' those who would otherwise be likely to be disqualified as having idiotically nothing to propose, hindering the emergent 'common account' [...]".

Participation in place-making negotiations demands new skills and sensitivities from experts and professionals. Architects, as expert participants, rarely have full understanding or control of situations. Instead, as experts, architects negotiate, respond to pressures, utilise opportunities, engage in conflicts and struggle for understanding together with the other actants.

Architectural practices need to become more open to achieve wider

participation and become more accountable. As Swann (2002, p. 57) insists:

> [s]urely the days are gone when only the designer and client approve a design. The public is having an increasing say in validating the design, environmental concerns being an obvious example of the way that public dialogue is impinging on design. There should be no qualms about design benefiting from the need for practitioners to make their processes visible and socially responsible.

Openness of the design process can expose the amount of resources invested into making a product (cf. Thackara, 2005). This need is evident in the early success of such broad initiatives as the Open Architecture Network set up as "an online, open source community dedicated to improving living conditions through innovative and sustainable design." (Architecture for Humanity, 2007) Proponents of "open building" (e.g., see Habraken, 1998; Kendall, 1999; Kendall and Teicher, 2000) also have long argued for inclusive design and use practices (also, see Châtelet, 2006; Haque, 2005; Kaspori, 2006; Mitchell, et al., eds, 2003; Schachter and Levi, 2006; de Jong and Schuilenburg, 2006).

Open development strategies can help to retain design ideas produced and validated by multiple participants. By contrast, in typical architectural competitions the jury selects only one project for implementation while many of the valid and compatible ideas from the other submissions remain unused. One alternative type of project development is the Wiki concept. Reputedly, volunteer-written Wikipedia (Wikipedia, 2007) is bigger and often more accurate than its commercial rivals (e.g., see Giles, 2005). While often impressively successful at enrolling actants, Wikis also can trivialise content by rejecting unusual contributions. Despite this and other drawbacks associated with widely collaborative modes of working, their benefits are numerous and can serve as inspirational examples for the development of more open and flexible approaches to architectural designing.

Multiplicious and inclusive communication is difficult to achieve because stakeholders might not wish to speak or have no voices as, for example, in the cases of non-humans or future generations or societies. Designers might not know about important stakeholders and

stakeholders themselves might not be aware of significant consequences of ongoing developments.

Traditionally, designers started their work when somebody else already framed the problem, for example in a design brief. The performative-place approach emphasises that the challenges of today's architectural design often reside in unframed territory. Architects need to be proactive in their search for opportunities as well as for problems. New design opportunities arise from the efforts to build communities, inspire, educate, probe for alternative worldviews, uncover unobvious consequences and demonstrate the value of design work. In the words of Thackara (2005, p. 8) addressed to all designers,

> We need to think, connect, act, and start processes with sensitivity. We need to foster new relationships outside our usual stomping grounds. We have to learn new ways to collaborate and do projects. We have to enhance the ability of all citizens to engage in meaningful dialogue about their environment and context, and foster new relationships between the people who make things and the people who use them.

Persuasive communication is essential for proactive leadership. In place-making negotiations, contributions of architects always mix with contributions of many other actants. In order to be convincing in these ongoing negotiations, architects need to be able to convince the other participants and inspire them to work in support of common goals. Architectural offices succeed and fail as businesses, practices, organizations and social networks. Contemporary practitioners increasingly recognise the role of marketing and public relations in architectural practice because they experience intensifying competition and often have to defend against the negative image associated with the architectural profession (Haupt and Kupitza, eds, 2002, p. 7; also, see Iloniemi, 2004; Lindon, et al., 2004).

In communication with a broad range of stakeholders, techniques for engagement, campaigning and translation become particularly important for the elicitation of feedback and fosterage of collaborative innovation. The performative-place approach suggests conceptual tools to the development and deployment of critical architectural-design because it can bring new opportunities for reflection and collaboration. In support of this position, Bowen (2007) reports

that in his product-design experimentation "'[c]ritical artefacts' have proved more useful [...] than direct questioning techniques; in particular as a way of enabling stakeholders to engage with novel situations and consequently engage in creative thinking about future possibilities." I suggest that instrumental employment of critical-design practices in support of creative communication and campaigning can also be beneficial in the tasks of place making.

Many interactions amongst stakeholders require non-trivial translation. Consequently, architecture needs to develop and utilise tools and methodologies for representation in support of such multi-modal translations. Contemporary architectural discourse underestimates the role of representation in place-making. Architectural visualisations often poorly respond to the concerns of multiple stakeholders or dynamism of places. Developers rather than architects most commonly initiate and finance the production of such visualisations. Consequently, promotional imagery dominates. In real-time environments, walkthroughs and flythroughs became prevalent. Such visualisations often create people-less and un-engaging environments that fail to portray the complexity of existing and the consequences of newly imagined places. Such techniques not only underuse the expressive potential of the new media but also misrepresent the nature of places by focusing on objects at the expense of performances and on singular, arbitrary interpretations at the expense of polyphony. Existing architectural representations often silently promote the worldview of the already-powerful by overlooking the multiplicity of possible engagements and focusing on showy visuals or functionalist narratives.

To conclude, the performative-place approach has suggested an understanding of places that requires and enables a critical reassessment of the creative processes in architecture. It is possible to guide the growth of performative places but this guidance requires a suitable creative-design process that can support broad collaboration and communication between heterogeneous actants.

III.4 PLACES AS PERFORMANCES AND PLACE-MAKING AS STAGING

In this chapter, I have referred to existing research and practice and demonstrated that notions of place common in architectural discourse are often incompatible with the contemporary situation. In particular, some common understandings explicitly state or implicitly presume that places are region-bound, located in space, contingent on stable identities, dependent on the existence of stable communities and associated or even equated with the concept of home. These understandings, often amalgamated together, lead to the construction of conceptual places that are singular, static, retrograde, romantic and exclusionary.

In order to argue with these assumptions, I have reviewed literature and practice concerned with contemporary places and spaces produced outside of architectural discourse. I have supported this search for an alternative, compatible and pragmatically useful understanding by the participant observation and investigative designing of my case-studies. This work has demonstrated that it is possible to theorize places as social constructions with relational nature and fluid boundaries. These re-conceptualized places are multiplicious, dynamic, negotiated and inclusive. As such, they can gracefully accommodate the recent technological developments and changes in social practices.

Throughout this chapter, I have also demonstrated how the concept of place continues to be useful for architectural design. Referring to the existing discourse and practice, I doubted a common assumption that buildings and other physical artefacts form the focus of architectural practice. Excessive focusing on artefacts explicitly or implicitly leaves place-making processes beyond the remit of architecture preventing the development of critical discourse and suitable design methodologies.

Contrary to this assumption, the interdisciplinary contributions and the practical knowing assembled in this chapter as the performative-place approach demonstrate that architects can proactively initiate, guide and foster the growth of places. This vision for architectur-

al practice becomes possible through a re-conceptualisation of places as enacted assemblies of relationships. This re-conceptualisation enables me to assert that place-making, and the performative activities it involves, can and must become one of the premier responsibilities of architects.

Another common position assumes that architects can continue creating adequate environments through their traditional practice and that architects' individualist approaches, referring to their memories, experiences and inspiration, are sufficient in this task. The discussion in this chapter suggests that this position depends on a narrow, romantic and exclusionary understanding of place. This thesis seeks to undermine this position by a broadening of the concept of place towards the compatibility with contemporary social-practices and emerging technologies in order to cast as necessary and initiate a reconsideration of the creative process in architecture. The new understanding of the creative process has to be compatible with multiplicity, openness, dynamism and subjectivity of performative places.

IV CREATIVE PROCESS AND DESIGN COMPUTING

In the Performative-Place Approach and Making of Places chapter, I introduced a re-conceptualisation of place as a dynamic enactment of relationships and argued that while it is possible to guide the growth of performative places, that this guidance requires a suitable creative-design process.

In continuation, this chapter seeks to answer the following research questions:

- Can architectural creative-design processes be suitable for staging places as recommended by my performative-place approach? What kind of creative process will that be?
- Can design computing support distributed creativity in place-making? What are the characteristics of design computing suitable for these tasks?

IV.1 DISTRIBUTED CREATIVITY

This section briefly overviews common, individualistic understandings of architectural creativity and proceeds to highlight the less-recognized capacities of creative processes for collaborative, distributed innovation. I recognise that—as a community of practice—architecture is a highly complex, continuously changing field that deals with widely diverging challenges and accommodates conflicting approaches. Therefore, my discussion of creative-design processes is necessarily pragmatic rather than exhaustive.

I suggest that conventional understandings of creative processes in architectural design, based on individualist and idealist approaches, are often incompatible with the challenges of place-making (on the ubiquity and power of such myths, see, e.g., Sawyer, 2006, pp. 18–27; 1986). Among such incompatible notions is the idea of singular, well-defined, in-control authorship. In the field of technical innovation,

> [t]he conventional view assumed that the product of the invention process has well-defined characteristics. For example, the patent system was designed on the assumption that the functionality of each invention could be described in detail, so that its novelty could be unambiguously decided. It was also assumed that invention had a well-defined author—the inventor—and a well-defined moment of birth. (Tuomi, 2006, p. 9)

A similar attitude is also common in architecture. For example, Habraken (1998, p. 76) criticizes "contemporary architecture's remarkable persistence in promoting and insisting upon unified vertical control [...]" and its resulting inadequacy in contemporary social situations. Likewise, Symes et al. (1995, p. 20) observe that "architects believe the most important feature of their calling is the opportunity it gives them to exercise individual creativity [...]".

In a contrasting stance, Stillinger (1991) demonstrated the impossibility of singular "pure authorship" (p. 183) in literature. Instead, he argued that authorship of books is multiplicious and that they lack final, authoritative or best versions. Similarly, singular authorship or singular outcomes are impossible in complex situations occurring during architectural design. While I do not deny the commonality or importance of strong authorial influence, I believe that the rhetoric of singularity and control can be unhelpful and misleading in place-making because it requires wide and open participation. For example, Hill (2003, p. 3) warns that "[o]ne of the aims of the architectural profession is to further the idea that only architects make buildings and spaces that deserve the title architecture [...]". I suggest that instead of trying to preserve such exclusivity and strive for authorial control, the suitable conception of the creative-design process ought to recognise the inherent multiplicity of authorship and provide techniques that allow and encourage polyphony in multilateral, negotiatory designing. Once stakeholders in a design process or observing research-

ers acknowledge the fundamentality of multiple authorship, architects emerge not as authors but as actants engaged in the politics of making. In situations with multiple authorship, architects have important advantages, for example in the form of expert knowing, but their captaincy is not automatic. Instead, they have to gain influence and attain leadership by communicating with, persuading and inspiring other participants.

Another notion incompatible with the need for openness is the idea that creativity is purely subjective, mystical, divine or supplied by the impenetrable subconscious. This knowledge-sceptical attitude makes it impossible to define, discuss or study creativity (e.g., cf. Sternberg and Lubart, 1993, p. 229–232; Weisberg, 2006, p. 4). In relationship to design, Coyne and Snodgrass (1991, p. 124–131) suggested that the common understanding of design knowing as subjective and irrational has Romantic roots and is problematic. They further confirmed that the view of creativity as mysterious and different from other human endeavours "is evident in certain theories about the design process, particularly in architecture." (p. 124) I suggest that in architecture, this understanding parallels a similarly mythical and romantic view of places as essential and unknowable. Resulting approaches in professional architectural education and practice cultivate highly individual, fashionable or marketable styles and insular working-patterns that prevent wide collaboration and contextual learning.

A related attitude presumes that creativity is the property of a genius and that a creative act is synonymous with the concept of epiphany. Thus, Fisher (1997, p. 10) observed that "the romantic genius is the prevailing stereotype for creative people and is evident in management literature, in design education and in the psychological study of creativity itself." Similarly, Kasof (1995, p. 331) agreed that "[t]hroughout history, laypeople and scientists alike have tended to attribute creative behavior to dispositional rather than situational causes." Berkun (2007) also supports this view in his discussion on the myth of epiphany in stories of innovation. People with these beliefs find it difficult to accept that external support, for example that provided by computational tools, can contribute to creative processes or that

creative geniuses can usefully collaborate in their creative work with normal people.

Professional architectural-design practice and theoretical writing on design also often presume that designing implies focused goal-orientation. For example, Simon's (1996, p. 111) much quoted and comparably inclusive definition states that "[e]veryone designs who devises courses of action aimed at changing existing situations into preferred ones." Friedman (2002, p. 507–506) agrees and summarises that "[m]ost definitions of design share three attributes. First, the word design refers to a process. Second, the process is goal-oriented. Third, the goal of design is solving problems, meeting needs, improving situations, or creating something new or useful."

The broad interpretation of this definition can allow indirect routes to preferred situations and attainments of goals that are newly emergent as well as additional or tangential to the originally specified. However, the potential for such broad interpretation is not apparent in these definitions. Yet, an inclusive understanding of what constitutes valid goals can greatly expand the reach and potency of such definitions. For example, reversing global warming is a noble goal and it is increasingly necessary for design efforts to consider it but its attainment is impossible by any one design. Necessarily, contributions to such an overarching goal will be partial and difficult to evaluate. Often, they can combine with the primary local goals and aim to contribute to the socio-cultural sphere through, for example, awareness-building. More narrow interpretations of goal-orientation can lead to exclusion of potential influences and consequences. While I do not deny that usually designers set out to make purposeful, local changes understandable and acceptable to the participants in a given design situation, I would like to draw attention to the engagements of design processes with broader social practices, cultures or discourses. In conditions of complexity, dynamism and political tension, apparently tangential sources of learning or design outcomes become as important or interesting as the primary or openly declared intentions. I suggest that architects ought to recognise these emergent involvements as valid, useful or at least consequential. This recognition

is a prerequisite to the development of design workflows capable of supporting inclusive place-making.

Another common assumption is that the primary outcome of designing is in prescriptions for change or in new artefacts. Dunne and Raby (2001, p. 58) describe this dominant approach as "affirmative design", or design that "reinforces how things are now [and] conforms to cultural, social, technical and economic expectation." Design that sets out to generate exclusive or dominant affirmative-prescriptions risks overlooking ideological biases, alternative usages and potentially significant but unobvious stakeholders.

Similarly to the inattention towards the performative characteristics of place, practitioners and researchers until recently remained inattentive to the performative characteristics in creativity and design studies. Sawyer (2006, p. 7) confirmed that "[r]ecent overviews of creativity research have neglected performance entirely [...]". Winner (1982) or Sternberg (1999) are examples of such omissions. The omission of performative engagements from the study and the conceptions of creativity leads to undervaluing of its improvisational and collaborative aspects.

Other similarly problematic attitudes especially common in architectural practice and education include the prioritising of outcomes in the forms of material objects, a preoccupation with problem-solving, the valuing of absolute categories such as harmony and beauty, the specialisation in secluded knowledge-domains and an adherence to existing commercial working-practices with a client brief as an initiation and an artefact as an outcome.

While it is probably impossible to find a conglomeration of all beliefs described above in any one person, their partial and often implicit adoption still constrains creative opportunities and impedes the integration of technology into architectural practice. Moreover, according to Weiner (2000), individualist, mystical understanding of creativity and creative people is a recent and Western conception promoted by the ideas of the Enlightenment and spreading across all cultures in the contemporary global context. He insists (p. 17) that "[w]hile all of human history might be viewed as the history of crea-

tivity, it is nonetheless probable that neither any past society nor the traditional ones existing today would recognize our concept of 'creativity'." In these conditions, it is apparent that the concept of creativity in architecture, as elsewhere, deserves reconsideration.

Recently, in response to similar concerns, design researchers and practitioners in many areas began developing alternative, contrasting understanding of creative processes in design.

> Creative thinking has tended to be regarded as mysterious, but new explanatory descriptions of creativity in design are beginning to emerge from empirical studies. In particular, it no longer seems correct to promote the key feature of creative design as dependent upon an intuitive, heroic 'creative leap' from problem to solution. Problem framing, co-evolution, and conceptual bridging between problem space and solution space seem to be better descriptors of what actually happens in creative design. (Cross, 2006, p. 92)

Already in 1980s the research of creativity began diverting its attention from the achievements of remarkable individuals to socio-cultural approaches to studying creativity in context and action (e.g., see Sawyer, 2006). I offer my interpretation of this emerging understanding drawing on the experiences of my case-studies and the reading in the practice-based fields such as design, management and education. Adopting a pragmatic stance, I focus on the characteristics that highlight practical, sharable, adaptable and learnable characteristics of creative-design processes.

Contrary to the views that attribute creativity only to remarkable individuals, a more inclusive understanding of creativity results from the admission that creativity and design are ubiquitous and practiced by all. Most researchers agree that all people have creative capacities (e.g., see Amabile, et al., 1996; Csikszentmihalyi, 1996; Eysenck, 1993; Sternberg and Lubart, 1995) and while creativity research distinguishes between different types of creativity, it is liberating to see contributions of all actants as potentially creative. Furthermore, design is one of the fundamental creative human-activities. People practice designing in everyday situations even if they do not recognise it as such. Similarly, many professions that do not describe themselves as belonging to the design field also practice forms of designing. Ubiquity

of design practice establishes the potential for cooperation between multiple actants with disparate backgrounds.

Ubiquity of creative work also establishes the foundation for the understanding of creativity as a distributed and situated phenomenon. As Tuomi (2006, p. 7) insisted, "[a]ll innovation is social innovation. Innovation does not happen "out there" in the world of objects, but in society and in minds." Human creativity is a reaction to unpredictable situations in the environment such as changes in the communities of practice (e.g., see Hildreth and Kimble, eds, 2004; Tuomi, 2006).

The recent but growing literature on distributed cognition and embodied intelligence (Clark, 1997; Lakoff and Johnson, 1999; Varela, et al., 1991) provide a theoretical and empirical background to this view. For example, Hutchins (1995, p. xiii) in his discussion of "socially distributed cognition" insisted that "[t]he emphasis on finding and describing 'knowledge structures' that are somewhere 'inside' the individual encourages us to overlook the fact that human cognition is always situated in a complex sociocultural world and cannot be unaffected by it." His discussion of distributed cognition led him to formulation of such concepts as "distributed memory" (p. 220) and "distributed problem-solving" (p. 226). Similarly, Norman (1993, p. 146) insisted that "[p]eople operate as a type of distributed intelligence, where much of our intelligent behavior results from the interaction of mental processes with the objects and constraints of the world and where much behavior takes place through a cooperative process with others." Gorman (1997, p. 589) provides a link from distributed cognition to design creativity by arguing that "[c]ognition clearly is both embodied in brain, hands and eyes, and also distributed among various technologies and shared across groups [...]" and that the process of invention depends on distributed cognition. I argue that distributed, situated understanding of creativity is necessary for place-making. In complex situations, people can find better resolutions for challenges in collaboration by cultivating techniques and mustering ways of knowing that are hard or impossible to access for individuals (Bennis and Biederman, 1997; Gordon, 1961; John-Steiner, 2000; Kelley, 2001;

Osborn, 1953; Paulus and Nijstad, eds, 2003; Sawyer, 2003).

The understanding of creativity as distributed does not deny the presence or importance of personal styles and approaches. Experts often claim authorship after the successful completion of a project and defend it in power struggles because possession of authorship constitutes a valuable form of cultural capital (for the concept of cultural capital, see Bourdieu, 1973, 1986). Artists and architects often develop and maintain their personal styles and identities because these phenomena also constitute significant cultural-capital and can acquire substantial monetary value. However, I suggest that in place-making negotiations, such effects as authorship or personal style also assume roles as tools for campaigning, provoking and convincing. I see these roles as compatible with the emphasis of the performative-place approach on the negotiatory characteristics of designing.

The distributed character of the creative-design process also suggests that linear, terminal, iterative or any other rigid well-structured models of the creative process cannot describe the complexity of design situations. In the most general sense, designing is an ever-going process or, rather, many simultaneous processes. This understanding contrasts a common view that sees the creative process in terms of stages. A stage-based view first appeared in Wallas's (1926) model that included "preparation", "incubation", "illumination", and "verification" stages. Subsequently, many researchers incorporated this model or its variants in their work (e.g., see Arieti, 1976; Weisberg, 2006). I do not share the understanding of the creative process as a linear progression or as a process with clear stages. Similarly, Vinacke (1952) insisted that creativity in the arts is a series of successive illuminations rather that a sequence of qualitatively distinct steps. Gestalt philosophers insisted that step-by-step models imply segmentation uncharacteristic of creative thinking (e.g., see Wertheimer, 1982). In design, Hickling (1982) suggested a nested-iteration model of the design process that is more complex than linear, iterative models suggest. More recently, Gedenryd (1998) discussed the holistic, multi-directional and multimodal nature of creative processes in design and Heape (2007, p. 368) argued that the design process "can be described as the construction,

exploration and expansion of a conceptual space [...]". Compatibly with the more flexible of these interpretations, I see designing as a complex assembly of multiple continuously re-enacted relationships. These re-enactments assemble into a complex multi-layered structure of analysis, concept-making, judgement, selection and action. Design processes intermingle; they are not predominantly linear, cyclic or iterative even though they might include linear or cyclic fragments. Each of the performances in this unstable assembly involves breaks, repetitions, re-conceptualisations and changes in focus. By prolonging designers' involvements with situations and encouraging closer involvements with a broader scope of participants this view of design process promises benefits to collaborative learning, community building or sustainability. For example, McLennan's (2006, p. 38) governing principles of sustainable design,

> Respect for the Wisdom of Natural Systems—The Biomimicry Principle
> Respect for People—The Human Vitality Principle
> Respect for Place—The Ecosystem Principle
> Respect for the Cycle of Life—The "Seven Generations" Principle
> Respect for Energy and Natural Resources—The Conservation Principle
> Respect for Process—The Holistic Thinking Principle

all require extended involvements with design situations and fundamental changes in the creative-design process (also, see Benyus, 1997; McDonough and Braungart, 2002).

An extended involvement with a broad range of participants casts creative-design processes as a way of communicating and communication as a foundation of social creativity (Sonnenburg, 2004; Mai and Akerson, 2003). For example, Stillinger (1991) showed how creativity depends on relationships, connections and access to information. Many researchers also agree that communication is essential for the success of collaborations (Harris and Sherblom, 2001; Mabry and Barnes, 1980; Tubbs, 2007). The performative-place approach emphasises the negotiatory nature of places and I suggest seeing polyphonic, simultaneous communications as an essential part of place-making. For example, Lawson (1999, p. 175) argued that "much of architectural design is actually done through conversation. However because that conversation is not recorded and the drawings are we tend not to no-

tice its importance" (also, see Lawson and Loke, 1997 for the details on this argument). Not only conversation is important, but the invention (or design) of language and metaphors in communications between stakeholders is crucially influential. It is insufficient to ask stakeholders of their opinions because they might not be able to understand questions or have ready answers. Instead, experiential engagement of observing, sharing, exchanging, reflecting or provoking can create a better ground for understanding, mutual learning and, consequently, for distributed creativity. Utilisation of visual, dynamic representation, direct participation, representational physical-objects and dramatic narrative can help in these tasks.

Many researchers agree that tacit, practical knowing is essential in designing, professional practice, collaboration and learning (Argyris and Schön, 1974; Gendlin, 1962, 1998; Polanyi, 1966; Ryle, 2000; Schön, 1983). Tacit knowing is individual, subjective and hidden. Therefore, its externalisation and transfer are problematic. However, researchers in the fields of education, organisational learning and collaborative innovation increasingly seek to engage with tacit knowing and find techniques for its sharing for example in the communities of practice. For example, this interest is evident in Nonaka's (1995, p. 62)

> modes of knowledge conversion [...]: (1) from tacit knowledge to tacit knowledge, which we call socialization; (2) from tacit knowledge to explicit knowledge, or externalization; (3) from explicit knowledge to explicit knowledge, or combination; and (4) from explicit knowledge to tacit knowledge, or internalization.

The growing palette of practical techniques for externalising, retaining and sharing embodied, implicit and shared knowledges sets up favourable conditions for distributed creativity and helps to dispel the exclusionary mysticism surrounding talented creators. I suggest that in line with this work, architectural research and practice need to further their techniques for working with tacit and other implicit knowledges.

Any creative engagement always produces multiple simultaneous outputs variously meaningful to different stakeholders and in different circumstances. For example, design can, often simultaneously, seek to solve problems, meet needs, improve situations, create

alternatives to existing or proposed situations, provoke, uncover unobvious opportunities, comment on existing or proposed practices, maintain the discourse and create communities. For example, Dunne and Raby (2001, p. 58), discussing their work on critical design, propose that it "rejects how things are now as being the only possibility, it provides a critique of the prevailing situation through designs that embody alternative social, cultural, technical or economic values. [...] Critical design is related to haute couture, concept cars, design propaganda, and visions of the future, but its purpose is not to present the dreams of industry, attract new business, anticipate new trends or test the market. Its purpose is to stimulate discussion and debate amongst designers, industry and the public [...]". Discussing their vision of critical design, Dunne and Raby suggest that such a probing attitude "has always been the case in architecture". I suggest that in order to preserve and develop its role in place-making, architectural theory and practice need to encourage this critical tradition.

An understanding of creativity as a social and distributed process accepts that participants in architectural design can fully specify the goals for a project only after they clarify the shape of its outcome. Successful designs usually go beyond participants' visions at the beginning of the process. This mode of work is a pragmatic response to the challenges of place-making. As other designers, architects have to work with wicked, socially constructed issues, concerns and problems (Buchanan, 1992; Rittel, 1972; Rittel and Webber, 1973). The ad-hoc, searching character of the design process stipulates the need for techniques that can suggest design moves in situations with fuzzy and unclear goals where reduction of complexity is impossible and undesirable.

Creativity often has to struggle for survival because fields of practice, organisations and professionals tend to value experience and established procedures. For example, Sternberg (Sternberg and Lubart, 1993, p. 229) maintained that "the acquisition of expertise can actually interfere with rather than facilitate creativity if one loses the flexibility to see problems in new ways." He furthermore insisted (p. 230) that many environments inhibit creativity because "creative ideas

are seen as not fitting in with the way things are done and are often suppressed [...]". The rapidly growing number of newly published academic and instructional books aimed to help organisations and businesses to foster creativity, innovation, intuition and leadership confirms that people in various fields believe that creativity requires and deserves support (e.g., see Allison, 2005; Berkun, 2007; DiVanna, 2003; Drucker, 1985; Flichy, 2007; Hargadon, 2003; Hohmann, 2006; Lessig, 2004; Lienhard, 2000; Miles, et al., 2005; Rickards, 1993; Semler, 1993; Senge, 1990; Smith and Reinertsen, 1997; Von Krogh, et al., 2000). In place-making as in the other fields, practitioners need methodologies for communication, negotiation and education that can foster their creative practices and help the other participants to understand and accept their creative work. These methodologies need to help practitioners to unlearn constraining habits and set-up situations conducive to innovation. Innovation occurs and brings useful results more consistently when participants work actively to maximise the number of innovation opportunities and structure their work to ensure utilisation of potential for innovation.

Based on the discussion presented in this section, I argue that creative design-processes are more accommodating and adaptable than common opinions suggest and that architects can cultivate this pliability to satisfy the characteristic of the design process necessary for the making of performative places.

IV.2 DESIGN COMPUTING AND DISTRIBUTED CREATIVITY

I suggest that architectural designing can benefit from seeing its practices as distributed creative processes because this vision can open new sources of inspiration and help in the generation of more inclusive places. Research and practice in many design-related fields suggest that collaborative creativity can achieve outcomes inaccessible to individual talents. For example, Hill (2003, pp. 10–11) argues that "[t]o imply that they can predict use, architects promote models of experience that suggest a manageable and passive user, unable to transform use, space and meaning." Instead, Hill (p. 28) suggests a concept

of "the creative user [who] either creates a new space or gives an existing one new meanings and uses." Discussing the implication of this concept for architectural designing, Hill (p. 89) concludes that

> [n]one of the design strategies that recognize the creative user is necessarily more effective than another as many circumstances influence use, and one strategy may be appropriate in one situation but not in another. Rather they suggest an expanding vocabulary available to architects who accept that architecture requires the creativity of the architect and the user.

Moreover, significant design outcomes have an immaterial and dynamic character that is only attainable through active participation of diverse actants. Krippendorff (2006, p. 6) observes that design challenges evolved from 1) products; to 2) goods, services and identities; to 3) interfaces; to 4) multiuser systems and networks; to 5) projects; and, finally, to 6) discourses. Krippendorff (ibid.) explains that

> [t]his trajectory is not intended to describe irreversible steps but phases of extending design considerations to essentially new kinds of artifacts, each building upon and rearticulating the preceding kinds and adding new design criteria, thus generating a history in progress [...]

With architectural work growing increasingly interdisciplinary, a utilisation of workflows able to support group creativity becomes essential. In this section, I argue that contrary to common scepticisms, design computing can greatly contribute to the development of such workflows.

Contrary to this opinion, common discourse and practice assume that design computing cannot contribute to creativity in architectural design because it cannot support spontaneity, multiplicity, fuzziness, tacit qualities and cultural awareness of architectural in-practice thinking. Until recently, architectural practice saw computers as suitable for drafting and post-ideation technical tasks only. As Frazer (2006, p. 210) observes, the "design computation is still only seen by many as 'just a tool' and remote from the real business of creative design [...]". Dokonal and Knight confirm (2006, p. 811) that "[n]owadays we have some buildings where the computer clearly had an influence on the design of the building at an early stage, but this is still an exception to the rule."

While ongoing experimentation with design computing rapidly

changes current practices, there is still considerable scepticism towards these efforts. A common opinion states that design computing encourages shallow outcomes unmotivated by the complex concerns of design challenges. Even people involved with computer-aided design for many years subscribe to such views. Thus, Lawson (Lawson, 1999, p. 176 and 2002) argued that "CAD might conspire against creative thought [...]" by encouraging "fake" creativity.

Lawson (1999, p. 177) also insisted that historically, among many influences on architectural form there were no influences from the design process. If his understanding includes the drafting techniques such as orthogonal projections or perspectival drawings, I have to disagree because I believe that designers could never avoid such influences even if they remained unacknowledged. Similarly, I do not think that allowing computers to influence the outlook of contemporary architecture and design is a new problem or a problem as such because, as I have argued above, place-making was always an inherently technical pursuit.

An influence of design tools on design outcomes can of course become a problem and needs continuing critical exposure as a political issue in a field where commercial interests guide the development and availability of modelling and design software. Pre-packaged software-tools, such as the ones provided by three-dimensional modelling packages, indeed can and do impose ready-made ontologies onto design problems. This is a problematic tendency. William J. Mitchell (p. viii) in his introduction to Terzidis (2003) asks:

> Who will control the emerging shape economy of the twenty-first century? One possibility is that a few large software developers will dominate the CAD market, treat libraries of shape construction procedures as proprietary intellectual property, and thus define the shape universes that architects can explore. Under this scenario, designers become consumers of standardized, centrally developed and marketed software products, and architectural historians of the future will characterize bodies of architectural work in terms of the software releases that generated them. Alternatively, architects might create shape construction procedures themselves, in [a] decentralised fashion, share them freely with open-source communities, and thus sustain a broad-based, vibrant culture of critical thought and innovation.

Parametric and building-information modelling (BIM) introduce new flexibility into design but do little to help question the assumptions about the form and meaning of basic architectural-concepts. Yet, these assumptions, necessarily made by software developers, determine the scope of possibilities supported by the software they develop and sell (cf. Eastman, 2006; Yessios, 2006a). Yessios (2006b, p. xii), founder and president of FormZ,[1] insisted that

> [i]n some ways BIM has become the drafting of earlier days. Drafting can only be applied to draw a known design solution, something that does not need any more intellectual searching and exploring (which would be design). So does BIM, which is based on parametrics, which can only be applied to known entities and solutions. In other words, the current manifestation of BIM leads to "franchise" architecture and restricts design innovation.

His answer to this problem is the integration of building information modelling with "artificial creativity [...] defined as the activity that is produced by a machine that would be considered creative if it were produced by a human being." (ibid.) Similarly, I argue that designers need to develop counter-measures that can allow them to remain flexible, pursue their design philosophies uninhibited and remain in communication with a wide range of actants.

I suggest that sceptical attitudes towards design computing, exemplified by the aforementioned concerns, are to do with a narrow, formal understanding of computing that does not take into account the complexities of socially-situated design practices. Therefore, in order to explain how computing can help make places, I have considered how design computing as a social practice contributes to multiplicious and open communication in the architectural-design process suitable for place-making.

Contrary to the scepticism towards the potential of design computing for the support of creativity and innovation, my case-studies showed that design computing could assist multi-directional, open, idea- and insight-generating, participatory creative-communications. Such communication can benefit designing understood as a social and inextricably-situated activity that can be flexible, multiplicious,

1. http://www.formz.com

provocative, critical, dramatic and surprise-bearing.

IV.2.1 Open-ended collaborative exploration

In this section, I argue that design computing is capable of staging randomness, ambiguity and indeterminacy that are necessary preconditions of creativity. I suggest that these conditions emerge from performances of hybrid, socially-constructed assemblages that include situated designers and computers. I agree with Pepperell (2002, p. 55, also see 2003, p. 117–138) that "while qualities like randomness, disorder and chaos can be simulated in computer systems, they can never truly emulate those in the world because computer systems do not contain the inherent dynamic complexity of the world." However, unlike him, I am not interested in "autonomous automated creativity" (Pepperell, 2002, p. 50). Instead, I highlight the creative potential that emerges from sustained multi-party conversations enabled by computers. These conversations are always complex and fuzzy and in their midst the ambiguity and randomness offered by computers can appear simultaneously indeterminate and meaningful to human participants.

The utilisation of emergent phenomena through the incorporation of randomness or improvisation in support of open-ended exploration has a long pedigree in the history of performing and fine arts, crafts and architecture. Recently, many "open-ended" strategies in music, literature and visual arts (e.g., Mayer-Kress, 1998) consciously pursued open-ended approaches. In literature, Eco (1989) provided a theoretical discussion on the "open work" approach. In architecture, Hensel (2004a), Shea et al. (2004; 2001) or Spuybroek (2004) among others experimented with projects utilizing open-ended, probing strategies.

Schön (1983, p. 157–167) maintained that "virtual worlds" (conceptually unrelated to digital environments that go by the same name) where "the pace of action can be slowed down and iterations and variations of actions can be tried [.]" (p. 227) are fundamental to designerly experimentation. My experience highlights that designers can share such simulative playgrounds with other actants, including comput-

ers.

Performative collaboration with the computer-supported entities capable of generative and emergent effects can help designers unlearn constraining habits and shed preconceptions about architectural form and its performative properties.

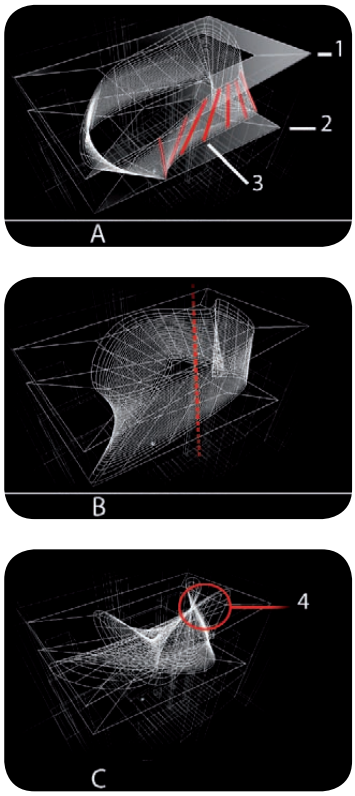


Fig. 51. *The Parasite*. Design variations, I. [A] and [B] shared all settings; the difference in form was due to the randomization of curve-end positions. In [C], our scripts sorted curve-end points along U rather than along V retaining other parameters identical with [A] and [B]. The red dashed line shows the dominant vertical direction the surface assumed if we sorted curve-ends along V. Sorting along U produced self-intersecting geometry. <1> Top guiding plane. <2> Bottom guiding plane. <3> Surface isoparms. <4> Self-intersecting geometry. We could not build self-intersecting geometry produced with higher curve counts using our cell-like building components. Consequently, we excluded distributions leading to self-intersections from further searches. (screen captures)

IV.2.2 Development through rehearsals

Creative engagement of architectural designers with computer-supported entities takes the form of multiple, simultaneous and recurring collaborative performances. Computers help to manage this process through the support of rehearsals that utilize their capacity for rapid calculation, automation, simulation, retention and representation. This capacity to stage rehearsals subsumes the capacity for rapid iteration through alternative geometries and opens design processes to multiple stakeholders.

Iterative design-processes in architecture have parallels in other disciplines that stage performances. For example, theatrical practices create performances through multiple iterations where participants in the creative process utilise chance discoveries, improvisations and even mistakes. Development through rehearsals was a primary method of work for such influential theatre directors as Jerzi Grotowski, Peter Brook, Joseph Chaikin and Richard Schechner (e.g., see Mitter (1992) on rehearsal techniques and Schechner (2003) for the evidence from his research and practice). This theatrical tradition also accepted the openness of outcomes as inevitable and beneficial. For Schechner, (2003, p. 239)

> [r]ehearsals have become centers of psychological, sociological, personal research. The only thing known in advance is that maybe a performance will happen during, not after, the process, and that an audience will enter the space to watch or interact with the performers.

Such practices cast performers as explorers rather than propagandists of a predetermined solution. Creative teams searched for balance in a performance through active practice.

I suggest that in their fundamental characteristics, architectural design processes are similar to those involved in developing theatrical-

performances and that a conceptualisation of design development as a series of rehearsals opens the way for a more inclusive, flexible and hybrid vision of collaboration between humans, computers and other phenomena.

For example, in *The Parasite* project, we consistently used heuristic, open-ended, iterative exploration to find the characteristics of architectural forms and the associated processes (see fig. 51, previous page and fig. 52, this page). Indirect, non-destructive manipulation enabled by computing was essential in supporting such design methods. With the help of parametric modelling and scripted automation, we could introduce modifications into the model and see the implications propagate into the subsequent stages of design. This approach provided us with the broader overview and greater predictive power that we needed to be able to choose between many alternatives suggested by the heuristic techniques.

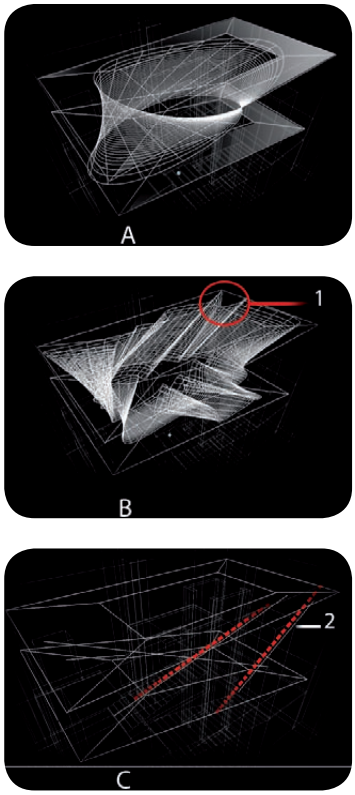


Fig. 52. ***The Parasite.*** **Design variations, II. [A] and [B] shared the settings excepting the number of dynamic curves that was 4 for [A] and 30 for [B]. Higher numbers of curves produced surfaces that tended to follow more closely the shape of the guiding planes and had higher probability for self-intersection. Lower numbers produced simplistic forms that could both follow the form of the guiding planes and dramatically deviate from it. [C] Dynamic curves distributed between guiding planes. <1> A small scale detail and an area of possible self-intersection. <2> Dynamic curve in the initial position. (screen captures)**

IV.2.3 Manipulation of complexity

The admission of extra actants into designing and the integration of random or generative processes results in design situations of greater complexity. Traditional tools often cannot cope with dynamic situations and numerous, contradictory requirements. I suggest that introduction of computing into the design process allows manipulation of complexity in direct support of creativity.

For example, one cause of extra complexity in architecture is in the adoption of curvilinear forms. To explore this type of complexity, in *The Parasite* project we set up a case-study that experimented with the design and production of complex, organically-shaped, cell-based geometries. During this project, we developed techniques for holistic, non-distractive, procedural manipulation of complex forms and tackled design and construction challenges posed by their configurations. In *The Parasite* project, computing, integrated in a hybrid design-process, proved capable of providing support for the creative manipulation of complexity because it enabled representation, inspection and comparison of situations in all stages of the design-process. In response to the rich feedback emerging from such probing, designers,

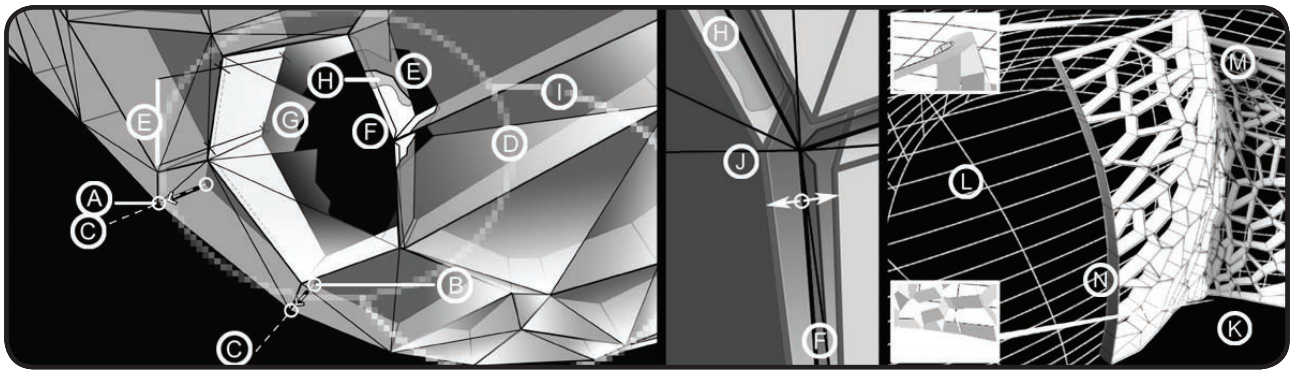


Fig. 53. *The Parasite*. Structure and detailing of the cells. [A] Offset point, shown circled. [B] Base point, shown circled. [C] Direction of offset along the normals, shown as dashed lines. [D] Cell. [E] Cell-wall with varying width. [F] Cell-skin flaps. [G] Cell-skin. [H] Glue. [I] Non-planarity of cell-walls and cell-skins, shown as shading changes. [J] Cell-wall insets. [K] Outer shell. [L] Input surface. [M] Generated cells. [N] Shell seam. (digital renderings)

in collaboration with other stakeholders, could adjust parameters or set up alternative processes. Because most changes did not necessitate redesigns of the generative procedures, rapid feedback to design decisions became possible. This feedback connected choices with consequences in a responsive manner that supported flexible, creative experimentation. While these capabilities for dynamic and multi-modal sampling do not necessarily lead to greater openness of the design process, they do provide opportunities for integration of many types of input. These inputs can come from various stakeholders as quantitative data or qualitative judgements. I suggest that non-destructive, procedural, computer-enabled approaches to designing allow multi-logical involvements that can support the situated, accepting understanding of creativity necessary for place-making.

Another significant form of support emerges as psychological aid for the participants in complex design situations. While "tolerance of ambiguity" (Sternberg and Lubart, 1993, p. 230) is a typical personal characteristic of creative individuals, they still experience anxiety over overwhelming complexity or non-closure of their challenges. I suggest that techniques enabling manipulation of complexity through procedural and generative approaches can alleviate this anxiety, strengthen the tolerance of ambiguity and, consequently, support creativity.

The requirements for management that emerged during *The Parasite* project serve as a good illustration of multiple, often conflicting criteria that apply to the design of even relatively small projects unitizing complex geometry. For this project, we needed to develop a physical structure that could conform to geometrically complex sur-

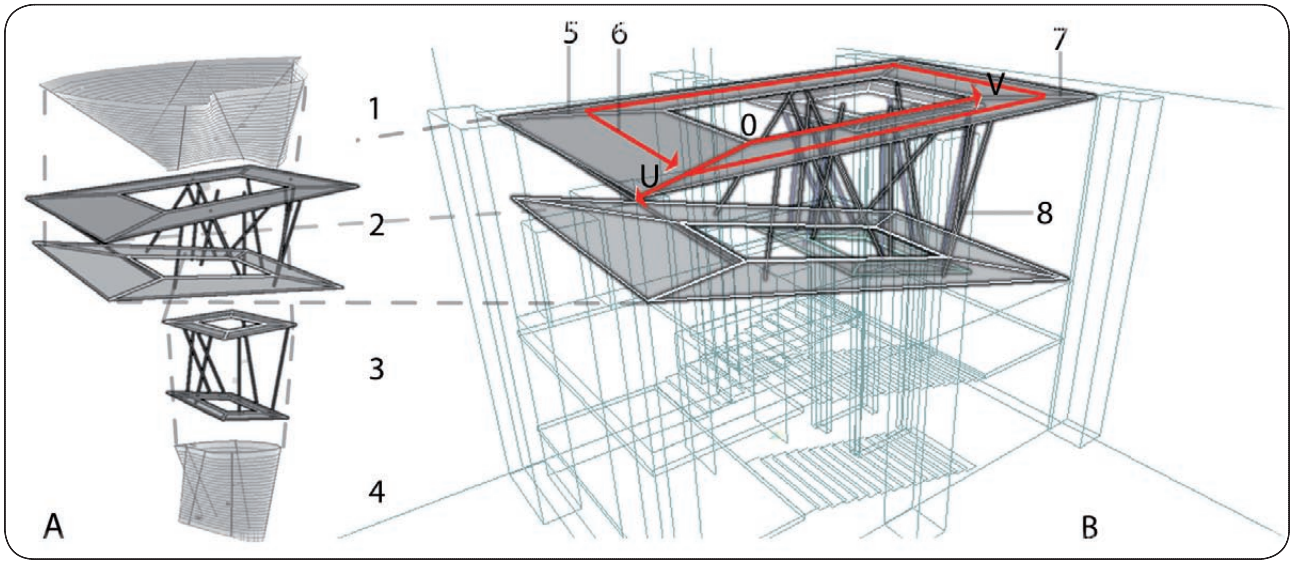


Fig. 54. *The Parasite.* **Dynamic shells and curves. [A] An exploded view of the design at frame 0. In response to the graphical-interface settings, our script constructed the shells by lofting the curves into two topologically cylindrical surfaces. Then the script made the curves dynamic by associating them with a hair system. The movement of the curves controlled the deformations of the surfaces. [B] Guiding planes and curves. We modelled the planes to follow the outlines of the walls and aligned them to the ceiling and the steps. Pairs of planes constrained the heights of the shells. Planes' widths constrained undulation of the shells' surfaces. <1> Outer dynamic surface with twenty-one U spans and seven V spans. <2> Guiding planes and seven curves of the outer surface. <3> Guiding planes and seven curves of the inner surface. <4> Inner dynamic surface with twenty-five U spans and seven V spans. <5> Profile curve used in the guiding-plane loft. <6> Direction of loft. <7> Guiding-plane loft-curve. We made the planes by lofting a degree 1 NURBS surface along a set of four NURBS curves. <8> Dynamic curve. (three-dimensional illustration)**

faces while being lightweight, relatively inexpensive and buildable without specialised equipment or expert labourers (for the visual impression of the resulting structure, see fig. 16, p. 75; fig. 17, p. 75; fig. 20, p. 77; and fig. 21, p. 77). The concept of the project also called for a design and construction methodology that could allow flexible manipulation and visual evaluation of dimensions, proportions, locations, visual density, surface texture, visual permeability and shadowing.

These requirements led to our interest in cellular structures and paper. Our preliminary research established that cellular structures made from cardboard were promising for further development. In particular, the existing experimentation with honeycomb structures and curvilinear geometries by Kudless (2005) provided a foundation for further work (for our experimentation with honeycomb structures, see fig. 57, p. 192). In continuation of this earlier effort, we developed a novel type of cellular non-periodic structure based on the Voronoi pattern (fig. 58, p. 193).[1] Voronoi patterns are in wide use in various applications in computer science. In architecture, Wingate (2005) used Voronoi diagrams to determine the form for the decorative ice-blocks used in a wall of the Ice Hotel, Sweden. Façades of Federation Square project in Melbourne, Australia, also utilised Voronoi and related Primrose patterns. Other projects utilising similar patterns also ex-

1. Defined as "the partitioning of a plane with n points into convex polygons such that each polygon contains exactly one generating point and every point in a given polygon is closer to its generating point than to any other" (Weisstein, 2005).

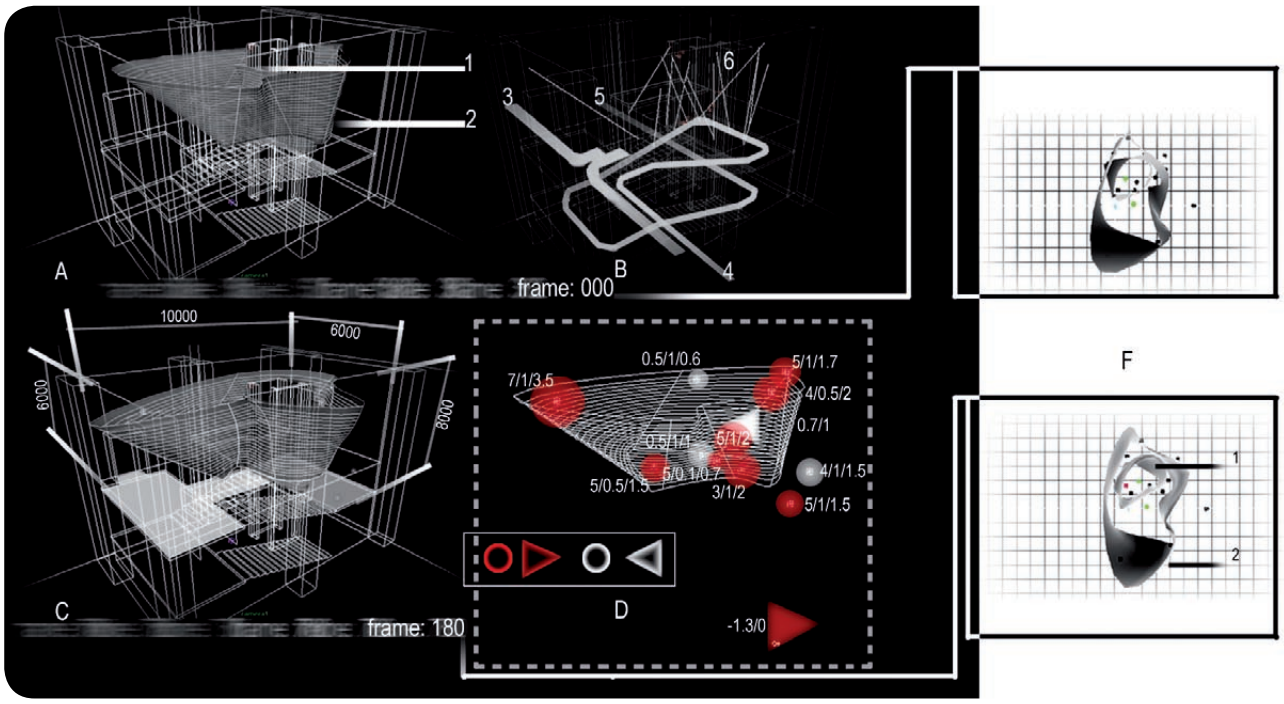


Fig. 55. *The Parasite*. **Shell transformations. We used dynamic force-fields and partially controlled turbulence applied to the hair systems to deform the dynamic surfaces [A]. We explored the capabilities of the dynamic surfaces via multiple iterations and adjusted the results to fit the constraints on pedestrian passage, visibility, curvature and surface continuity. We represented deformations as a dynamic simulation in Maya. After multiple comparisons, we chose one state, at frame 180, for further development [C]. [A] Dynamic surfaces in the stairwell (frame 0). [B] Dynamic curves in the initial position and lines showing the flows of movement through the space. [C] Dynamic surfaces in the surviving position (frame 180). [D] Force-fields and the outer dynamic surface in the initial state. Circles represent radial fields and triangles represent uniform fields. Outer surface fields are red and inner surface fields are white. The figures next to the fields show Magnitude, Attenuation and Maximum Distance. [F] Plan views of the dynamic surfaces in the initial (frame 0) and the final state (frame 180). <1> Outer dynamic surface. <2> Inner dynamic surface. <3> Entrance to the stairwell from the Main Hall of the museum. <4> Entry from the secondary street entrance that also served as the main entrance during the evening shows. <5> Path to the Performative Space section of the exhibition. <6> Two sets of dynamic curves. (screen captures)**

ist but this experimentation largely considers two-dimensional decorative patterns rather than primary form-making structures. As it is evident from biology, cellular patterns have a great potential for supporting flexible, adaptable and intelligent structures yet their utilisation in architecture or design is largely undeveloped.

Utilisation of Voronoi cells in a novel three-dimensional structure necessitated adoption of various criteria for constructability. Thus, we had to maintain simultaneous control of 1) cell sizes and proportions (fig. 60, p. 197: 3, 4); 2) conformity, or the degree with which cell-walls and cell-skins were able to conform to the curvilinearity of the input surfaces (fig. 53, p. 188 and fig. 60, p. 197: 3, 4). As cell-walls and cell-skins had straight edges, tighter tessellations resulted in better conformity; 3) planarity. All cell-walls and cell-skins were non-planar surfaces (fig. 53, p. 188). Low values of non-planarity added to structural rigidity but higher values could also make it more difficult to match the cells in the assembly and even cause breakage in the material; and 4) cell quantity. The more cells we used the greater was the weight of the structure and the higher number of operations required for production.

Computation can help to reduce this type of complexity, by con-

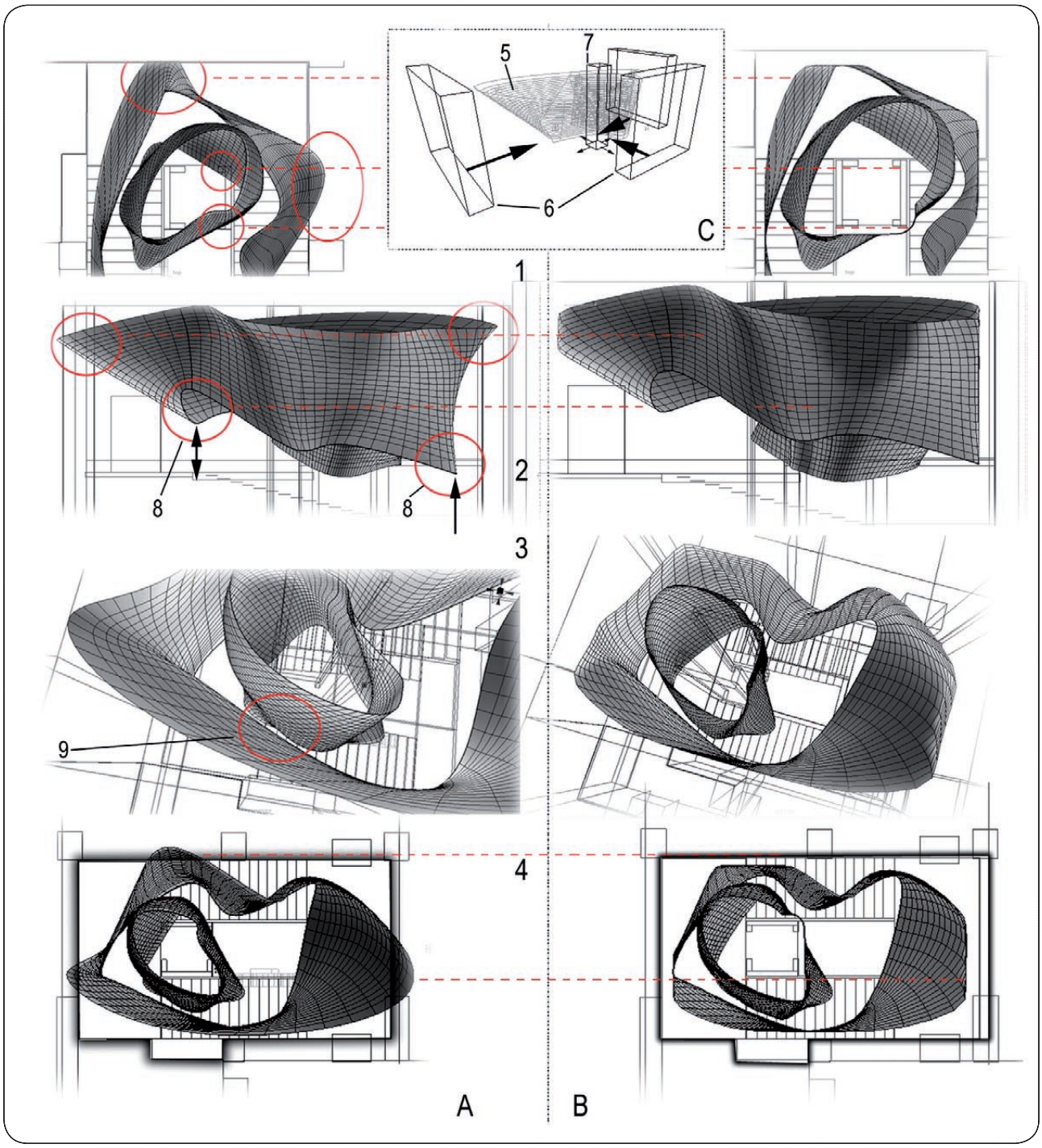


Fig. 56. *The Parasite.* Shell transformations. Refinement with fields and particles. After finding the shapes of the dynamic surfaces using fields, we converted these surfaces into "soft bodies". Then, we created four passive "rigid bodies" aligned to the four walls of the stairwell enclosure [C]. We animated these rigid bodies to force the shells into the confines of the stairwell. This procedure produced local surface-articulations impossible to achieve with dynamic curves [B]. [A] Surfaces before refinement. Red circles show the areas that did not comply with the criteria as specified by the designers and dictated by the needs of construction. [B] Refined surfaces. [C] The diagram of the dynamic surface converted into a soft body. <1> and <2> Areas where the dynamic surface intersected the bounding walls of the stairwell. <3> Bird's eye perspective showing a problem area. <4> Plan view. <5> Rigid bodies used to push the dynamic surface into the confines of the stairwell. <6> and <7> Animated rigid bodies. <8> The offset from ground was low to provoke a direct behavioural response from the visitors and passers-by. <9> The offset between two surfaces was too small to accommodate the width of the construction elements and we had to adjust it. (views of three-dimensional models)

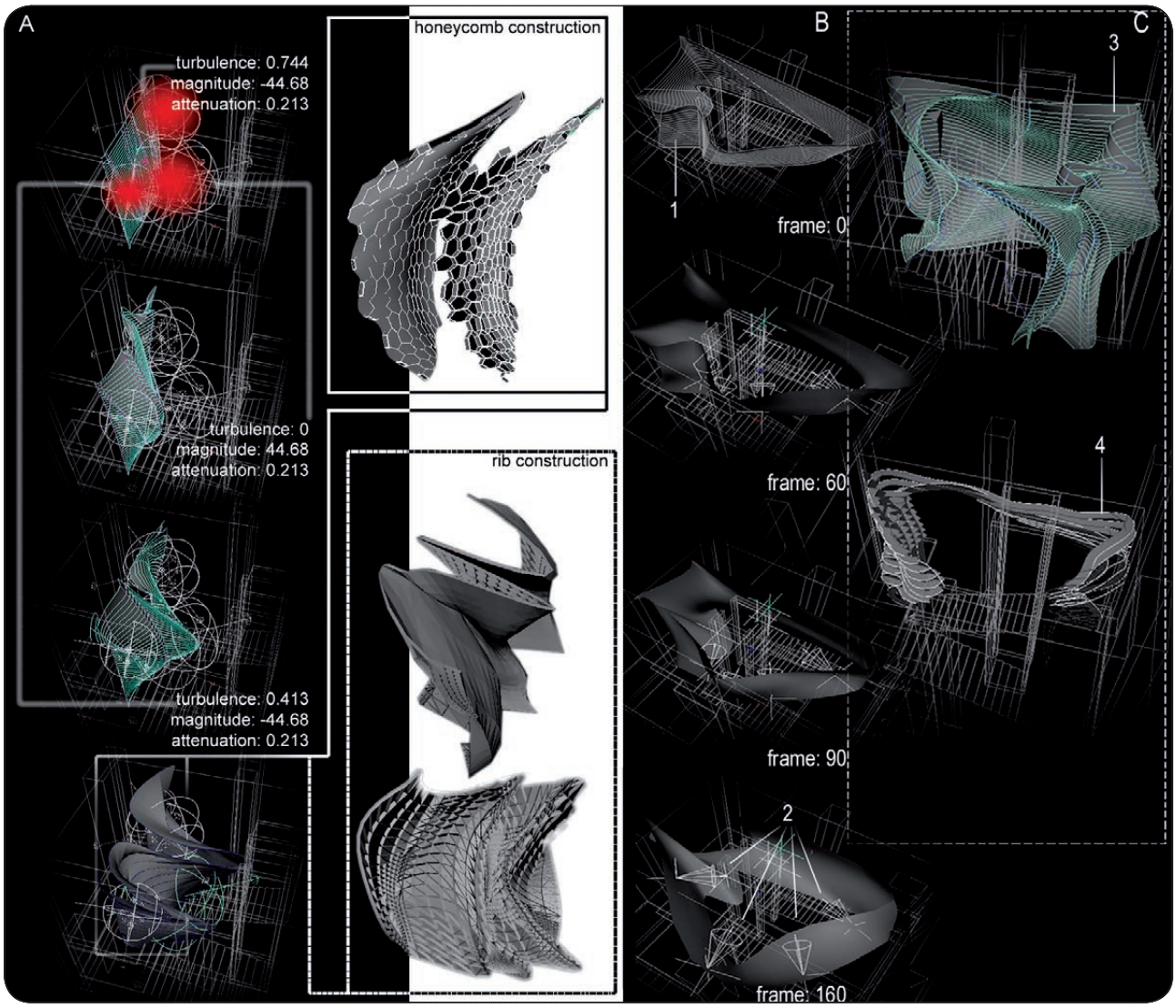


Fig. 57. *The Parasite*. **Deformation with fields and structural solutions. [A] Deformation of a test surface under the influence of three spherical volume axis fields. [B] Alternative design that considered the position and direction of the projector beams. The positions of the projectors were driven by the deforming geometry. [C] Alternative design and construction method using horizontal and vertical ribs. <1> Dynamic surface. <2> Projectors. <3> Dynamic surface. <4> Structural elements. (screen captures)**

straining the number of available controllable parameters through targeted punctualisation. One way to achieve punctualisation and gain an easy-to-manipulate system is to create custom assemblies of existing computational objects. For example, in *The Parasite* project, we manipulated geometry indirectly, with force simulations using fields and dynamic curves[1] to shape geometry (Roudavski and Artopoulos, 2006; Roudavski et al., 2006). Our technique, particularly the use of dynamic curves, was unique to the project, and contributed to a range of existing experimentation by other architects using (or, rather, creatively misusing) other dynamic systems such as deform-

1. Fields is a term in computer-simulated dynamics that denotes forces used to animate the motion of particles, soft bodies and rigid bodies. Dynamic curves are a physics simulation used in Maya's hair system.

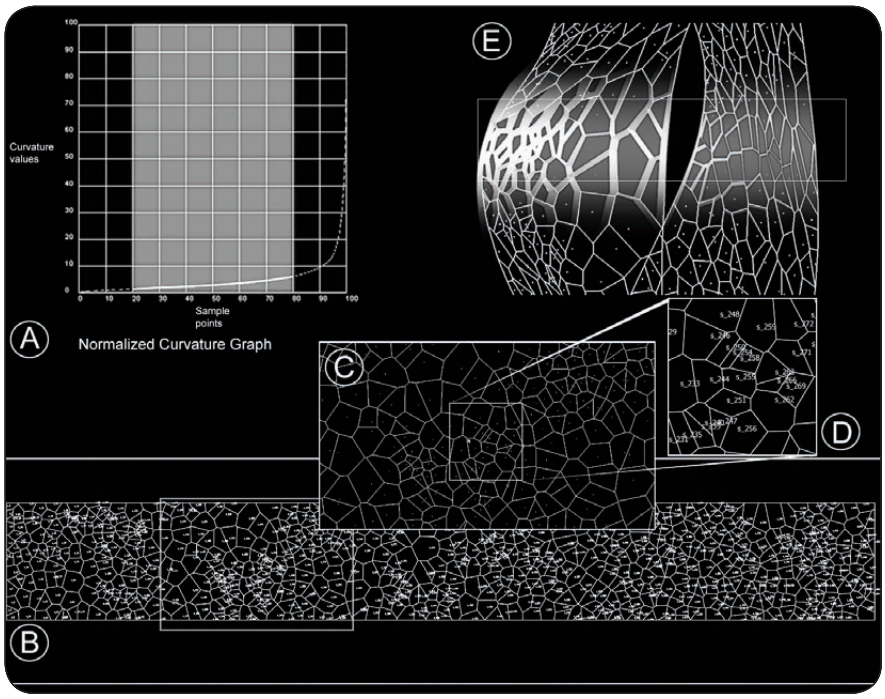


Fig.58. *The Parasite*. Voronoi cell-patterns. Areas with extremely high or extremely low curvature could break the dependency we implemented between curvature and point density. When the algorithm used the whole array of sampled curvature-values, the script tended to produce confined areas with high density while distributing the points on the rest of the surface almost uniformly. Thus, it was necessary to introduce an intermediate representation that would allow designers to visualize the sampled curvature values and to clamp the value range if necessary. To achieve this, the script normalized the array of curvature values to fit the 0–to–100 range and then displayed it as a graph [A]. Responding to the graph, designers could clip lower and/or higher portions of the range discarding part of the data. [A] A graph showing sampled curvature-values and clamping of the curvature range. [B] Inner-shell Voronoi pattern in XYZ space. [C] A fragment showing variable densities. [D] A fragment showing local variations produced after we added one of the two point-clouds to the other; see the narrow cell in the central area. [E] Voronoi tiles in the UV space. (digital drawings and renderings)

ers, skeletons and particles (e.g., see Leach, et al., eds, 2004; Lynn, 1999; OCEANNORTH, 2005; Rosa, 2004; Sevaldson, 2005; Zellner, 1999). Another, parallel approach that we developed during *The Parasite* project involves the creation of custom interfaces for scripted automation. Our models required many thousands of discrete operations. Even though our scripts did not have to describe every operation because we utilised many existing programming-functions, some of the scripts still amounted to thousands of lines of code. Direct manipulation of complex, three-dimensional models or extended scripts can be time-consuming, error-prone and exclusionary towards the majority of participants. Development and integration of custom interface controls that selectively hide and expose sequences of operations can eliminate or alleviate these problems.

In *The Parasite* project, we represented complex operations as simple functions in scripts or in custom-built visual interfaces. Such punctualisation or black-boxing is common in programming where high-level languages allow grouping of operations in functions, objects or classes. A similar technique is also common in three-dimensional character-animation where technical directors create artist-friendly visual controls for complex rigs. In architectural design,

purposeful punctualisation of complexity is unusual. Architects typically develop digital models in sequential steps with little or no case-specific automation.

In one of the examples from *The Parasite* project, we used Maya Embedded Language[1] to build dynamic surfaces. For this task, involving the production and performative evaluation of multiple versions, we created a custom visual interface with access to a limited number of controls whose selection and functionality we developed in parallel with form-making experiments. These controls allowed us to quickly set up alternative configuration and get rapid feedback. As Szalapaj (2005, p. 758), we found that "[i]t is important to iterate quickly in the early part of the design process because that is when radically different ideas can and should be generated and examined." Our custom interface allowed us to specify 1) the number of guiding curves to distribute (fig. 54, p. 189: 2, 3, 8); 2) whether the curve-end points were to be sorted along U or V directions;[2] 3) the value for dynamic-curve sample density; 4) whether the dynamic surface was to be periodic or non-periodic; and 5) whether point lock type would allow the ends of curves to be fixed or free (fig. 51, p. 186 and fig. 52, p. 187). Various combinations of these easy-to-modify parameters could output topologically and geometrically varied geometry within a constrained design-space. The ability to constrain the design space by specifying the functionality of the controls allowed us to choose the scope and target for heuristic exploration thus allowing us to direct the process of flexible exploratory experimentation until it converged to an acceptable solution.

Not only did we expose only selected, custom-built controls to be able to manipulate the process with greater ease and flexibility, we also combined multiple form-making steps into custom sequences. By deciding which steps to combine and how long the automated sequences should be, we were able to create a task-specific design workflow that balanced delegation and supervision thus shaping the communication between designers and computers. The interface de-

1. Maya Embedded Language is a C-like scripting language built into Maya. It allows access to most of Maya's functions and supports flexible automation.
2. U and V directions belong to two-dimensional (UV) spaces of non-uniform rational b-spline (NURBS) surfaces.

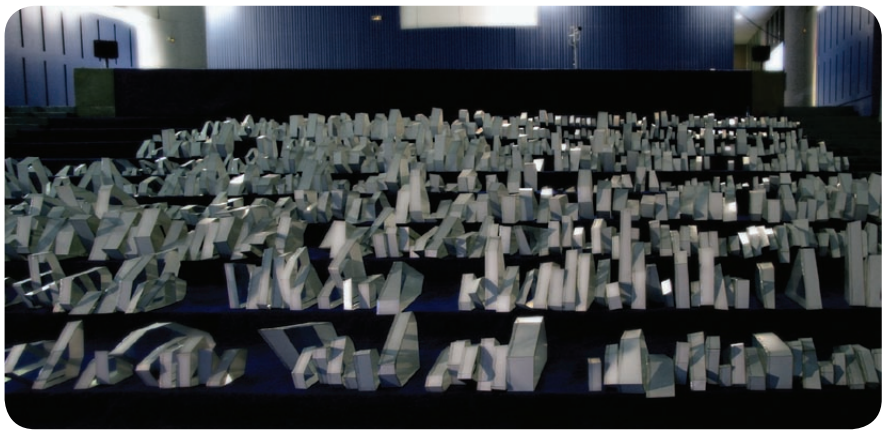


Fig. 59. *The Parasite*. 1560 cell-like building components for the outer shell ordered in the performance space in the lower level of the museum. Our scripts named all objects it created and sorted them into layers to facilitate manual inspection and manipulation. Being able to quickly identify and track each component was crucial when dealing with many uniquely parameterized but topologically identical artefacts. We used content, size, position and orientation of the labels to help manage components. We wrote several auxiliary scripts to aid the tasks of selection and manipulation. (location photograph)

scribed above 1) distributed two arrays of points, one array for each of the two already-constructed guiding planes; 2) distributed the points randomly in the planes' UV spaces; 3) left the points in random order along U-direction but sorted them in descending order along V ensuring that the resulting dynamic surface was not self-intersecting; 4) drew a non-uniform rational B-spline curve between each pair of corresponding points in the two arrays; 5) converted each curve into a dynamic hair; 6) set the attributes of each follicle according to the designer's input; and 7) lofted the surface through the curves thus setting the model ready for further manipulation through dynamic simulation (fig. 55, p. 190: D). Constructing the resulting geometry through a manual procedure would require days of work. By contrast, with our approach that utilised punctualisation we were able to generate alternative within minutes.

Another novel technique that supports working with complex design situations that mix structural, behavioural and other constraints is dynamic parameter-linking. The workflow we set up for *The Parasite* project allowed us to link any punctualised parameters with each other using custom-specified dependencies and rules. For example, our cell-generation script related surface-curvature values to cell-wall widths so that changes in the values of curvature would reflect in changes of cell-wall widths (fig. 21, p. 77). Among other benefits, parameter-linking helped to tame and explore the plastic potentials of our structure or, unusually for architectural design, directly link media and structural characteristics.

The ability to link parameters enabled the creation of meaningful

dynamic and easily adjustable constraints that we used to limit the exploratory design-space. With procedural constraints, we were able to focus on the evaluation of a small number of criteria knowing that the software would ensure that the new design alternatives would automatically satisfy the constrained parameters. For example, by constraining cell dimensions and non-planarity we were able to search for interesting shadowing effects while staying within the limits of constructability. We set up other constraints to limit volumes of the structure, sizes of openings for passage or visual access and relative positions of video projectors.

Such non-destructive techniques allowed us to retain procedural relationships between all elements of the workflow. This flexibility greatly extended our capacity for tracing complex consequences of design decisions effectively collapsing the traditional boundaries between several stages of designing because now we could undertake such tasks as massing and detailing simultaneously. Traditional architectural workflows allow few or no opportunities to inform early stages of the design process by the developments that occur during later stages. Introduction of design computing into the process allows coping with complex situations by sustaining controllable cause/effect relationships between various actants in various stages of design.

In architecture as elsewhere, the role of visual representations is crucial for working with complexity. According to Smith (1996, p. 19), "[T]he entire field of non-linear dynamics, popularly called 'chaos theory', could not have happened without the development of [...] [graphic] displays." Computation helps to manage complexity by giving access to multiple targeted representations. For example, in *The Parasite* project, we used guiding planes to constrain generation of shells because this approach allowed visual evaluation and control (fig. 54, p. 189). Similarly, we chose to visualise the distribution of Voronoi cells in two dimensions for visual evaluation and manipulation (fig. 58, p. 193: A, B, C).

Design computation also gives the capability for layering of multiple, simultaneous, heterogeneous inputs including observational, analytic, simulated or arbitrary data. Examples include isovists (or

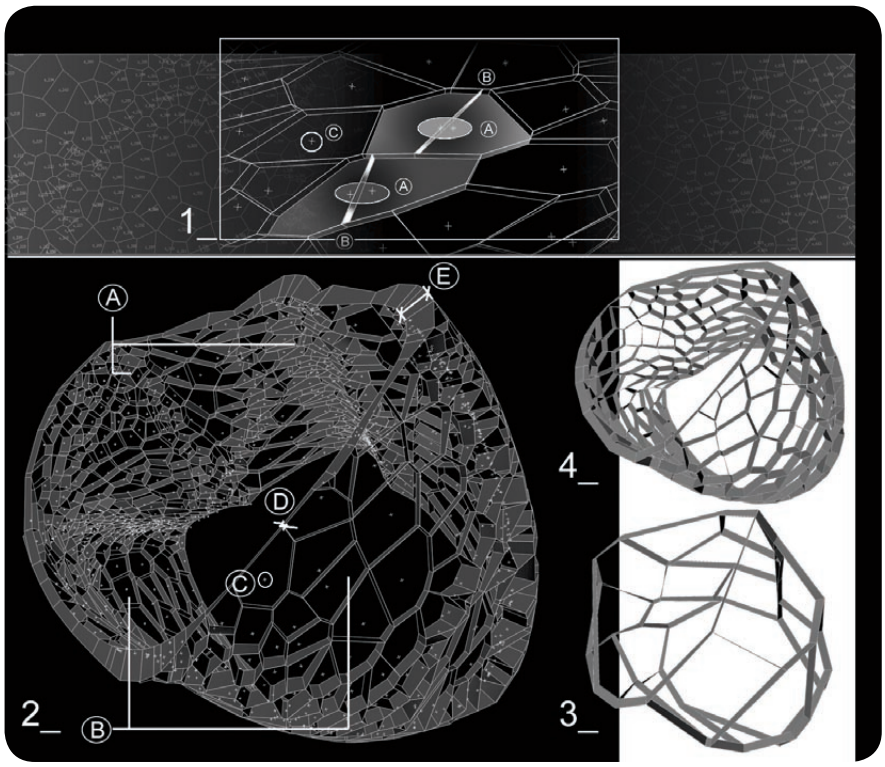


Fig. 60. *The Parasite.* **Variations in shell structure, inner shell. We used two methods to distribute the points: 1) Constant method attempted to distribute a given number of points on a given surface uniformly so that the resulting distances between neighbouring points were close to equal; 2) Curvature method related the point density to the amount of surface curvature so that the higher surface-curvature resulted in the higher point-density. We used 860 points and a combination of distribution methods to generate the point cloud for the outer shell. The combination of the methods allowed us to constrain the minimum distance between points to the values suggested by the structural capacities of the cardboard. [1] Fragment showing the structural consequences after we added two point clouds with different point distributions. [1_A] The scripts controlled the minimal distances between points during point distributions for each point-cloud separately. When we added one point cloud to the other, the distances between some point-pairs could be smaller than these thresholds. [1_B] An extra cell-wall inserted between the two points. [1_C] A point in a cloud. [2] An image showing structural variations. Settings: two point-clouds used, first cloud—Constant method, 150 points; second cloud—Curvature method, 700 points; curvature-dependent cell-wall height, minimum cell-wall height—50mm, maximum cell-wall height—250mm. [2_A] Formations of high density at high-curvature areas. [2_B] Low-curvature areas. [2_C] A point. [2_D] High cell-wall. [2_E] Low cell-wall. [3] One point-cloud used—Constant method, 20 points; Constant method for cell-wall height, 150mm. [4] One point-cloud used—Constant method, 200 points; Constant method for cell-wall height, 150mm. (digital renderings)**

viewsheds),[1] light-levels and body-movement measurements or simulative artificial-intelligence routines. In *The Parasite* project, the parameters of the structure that such data could drive included fenestration, cell-skin and cell-wall transparency, colour, light reflectance, light transmittance, cell-wall widths, cell-wall orientation, cell density and cell uniformity. The ability to include multiple procedural cross-influencing inputs allows holistic manipulation of complex situations and discovery of unobvious patterns and relationships.

In *The Parasite* project, computation also supported complex management of materialisation and logistics. Using digital and rapid-prototyping physical models, we were able to develop and test the production and assembly of physical components in parallel with computational form-finding. The ability to develop workflows during designing is essential for complex projects involving intricate structures, multifaceted teams and distributed production. In *The Parasite* project, we designed workflows and built specialised scripted tools for developing from three to two dimensions, fitting into the dimen-

1. In architecture, an isovist is the set of all points visible in all directions from a given vantage point in space (Benedikt, 1979). Also on isovists, see Hillier and Hanson (1984) and Hillier (1996). A viewshed is, similarly, an area of space visible to an observer.

sion of cardboard sheets, naming, sorting, grouping and searching of many confusingly similar details (fig. 59, p. 195). This preparation proved essential during construction where it helped to manage large teams working in different places and on different tasks.

The examples in this section demonstrate that design computing is capable of providing unique tools and techniques for working with complexity. These tools can be indirect, dynamic and non-distractive informing the design process while retaining its flexibility and open-ended character. Greater ability to manipulate complexity is a characteristic supportive of the creative process.

IV.2.4 Flexible feedback and evaluation

Improvisation, the inclusion of random and open-exploration processes as well as heuristic approaches to design create messy and complex outputs. In these conditions, support for multi-modal feedback and evaluation becomes essential. Our experimentation in *The Parasite* project demonstrated that design computing is capable of usefully supporting various types of feedback useful for the creative process that emphasises open-endedness, multiplicity and negotiation. Better evaluation and feedback help designers to communicate with themselves, engage with the other members of the design team and the wider range of stakeholders.

Our computational techniques supported evaluation of in-practice experiments by enabling versatile qualitative comparisons. For example, we could evaluate generated forms in terms of massing, light effects or ability to dramatise and estrange the existing museum-stairwell. Through easy versioning, we were able to follow alternative design-paths and compare their outcomes. We could also quickly compare alternative designs at various stages of development. Using computation, we were also able to integrate quantitative comparisons into the creative process. For example, we could estimate quantities of components (e.g., fig. 60, previous page: 3, 4), assembly operations, building materials and costs. Such estimations helped us to evaluate our design proposals against multiple conflicting constraints.

IV.2.5 Translation

My case-study projects showed that design computing could support translation between multiple heterogeneous participants.

For example, parameter-linking can help communication between domains of practice. For instance, in *The Parasite* project, we linked orientation of the cell-walls to the positions of the video projectors. In the resulting set-up transformations of the architectural structure guided the moving-image formation by opening or blocking light cones, controlling shadow distributions, framing views and articulating sculptural properties. This procedural communication collapsed the boundary between cinematography and architecture setting up new challenges for design and opening new creative possibilities in an emerging area of interdisciplinary practice that struggles to improve integration between "media facades" and architecture (e.g., see Sauter and Jaschko, 2006).

In *The Parasite* project, procedural and animated digital-models provided a foundation that united disparate concerns for example helping to balance the amount of cardboard available to build cell-walls and the visual permeability of the structure as seen by the museum visitors. Working in this dynamic multi-dimensional environment was important because the organic character of the form and the complexity of relationships between design elements curtailed the usefulness of traditional architectural representations such as orthogonal drawings or sections. Instead, we relied on procedural three-dimensional models that allowed us to animate and study proportions, occlusions, obstructions, shadowing, transparencies and other visual effects.

In theory, digital workflows support unified, multi-purpose digital-data models and allow multiplicious usage of design data. However, current practices often constrain the free flow of such data. For example, due to the struggle for control complicated by restrictive legislation on responsibilities and indemnities, it is common for architects, developers, engineers and builders to maintain independent three-dimensional models. Similarly, due to constraints on time, finances and hardware, architects rarely re-use design models for virtual-envi-

ronment representations.

Digital three-dimensional systems in support of integrated workflows are now common in aerospace, product manufacturing, shipbuilding and other industries but are still uncommon in architecture. For example, companies such as Dassault Systèmes[1] attempt to provide software able to service development from conception to manufacturing and manage complete simulations of product lifecycle including creation, engineering, production and maintenance.

In *The Parasite* project, we used one digital model for concept development, design refinement, representation, detailing and other discursive and technical tasks. The resulting flexible, modular and integrated design-workflow highlighted the creative potential of computer-supported translation for place-making and suggested promising directions for future research.

Rapid prototyping provides another important foundation for communication between heterogeneous actants by giving access to precisely and rapidly manufactured physical artefacts. For examples, Capjon (2004, p. 274–298) discussed such capabilities as "rapid multityping" that utilises physical prototypes for visualisation in early development, negotiation in conceptualisation stages, concept evaluation and production of small-scale series during user-feedback collection. Similarly, in *The Parasite* project, we used scaled and full-size physical models (e.g., see fig. 66, p. 212: B, C) to evaluate visual and sculptural properties of the structure, develop the fabrication process with manufactures, support the project's credibility in communication with other participants and develop strategies for logistics of fabrication, transportation and assembly including labelling, scaffolding, temporary rigging and storage. The utilisation of rapid prototyping in architecture is still in its early stages and research in this area constitutes another potentially fruitful direction for further work.

Punctualisation provides another powerful mechanism of translation. Ability to change simulated environment with simple controls, for example by displaying and hiding entities can enable non-experts' participation in the creative process. For example, interface controls

1. http://www.3ds.com/home/

that we designed for the *Virtual West Cambridge* and *Virtual Braunstone* projects allowed multiple participants to modify these virtual environments in the presence of others. Such simple options as the ability to highlight functional zones in a building (fig. 106, p. 235), provoked lively discussions and ad-hoc explorations of design alternatives. These modifications were only possible because our custom interfaces hid the underlying technical complexity of such manipulations and accentuated specific, meaningful relationships.

In this section, I have suggested that design computing casts various digital tools and techniques as devices for communication, translation and interpretation. As such, they can support the negotiatory creative-processes necessary for staging places.

IV.2.6 Performative thinking and learning

McCullough (1996, p. 109), in his discussion of craft and computation, insisted that "[w]e must balance the use of powerful [symbolic] notations with the use of tacit knowledge [...]". Similarly, Rust (2004, p. 80) acknowledged that "the historical move from one-off literal pictorial representations to the generalized alphabets [...] is essential for the development of knowledge." However, he also argued (ibid.) that

> it may be profitable to consider how different forms of representation, including complex, very specific artifacts, can support our efforts to employ tacit knowledge in our enquiries, whether we are seeking to engage our own tacit processes or those of our audience.

He also suggested (ibid.) that the

> tension between simplified generic symbols and complex specific representations reflects the relationship between atomistic methods, which have been so successful in advancing scientific knowledge, and the holistic outlook needed for successful design.

In his consideration of tacit knowing in designing, McCullough (1996) emphasized the bodily operation of tools and was, therefore, cautious about the capabilities of computers to support tacit knowing. The development of computing since the publication of his book did not offer much radical change in the development of haptic or visual interfaces. However, the acknowledgement of the distributed nature of the

creative process as suggested in this thesis suggests that architects can overcome the continuing limitations of hardware and software by adopting hybrid, multi-modal working practices that integrate traditional and digital tools.

Our work on *The Parasite* project confirmed that design computing can support tacit and performative ways of learning and knowing in complex design situations. Utilisation of computation in *The Parasite* project afforded employment of tacit knowing through the process discussed by a number of researchers (e.g., cf. Arnheim, 1969; Goel, 1995; Goldschmidt, 1991; Laseau, 2000; Lawson, 1990; Suwa and Tversky, 2002) as graphic thinking. Extending the idea of 'graphic' or 'visual' thinking, I suggest the term "performative thinking" to indicate creative processes occurring when designers engage with dynamic representations such as animations or interactive sequences. Our workflow for *The Parasite* project supported performative thinking by supporting dynamic simulations of transformations or emergent phenomena (fig. 55, p. 190 and fig. 56, p. 191), supporting rapid automation leading to alternative designs (fig. 51, p. 186; fig. 52, p. 187; and fig. 57, p. 192: centre panel, B, C) and enabling punctualisation through two-dimensional visual controls or fields (fig. 57, p. 192: A).

Yaneva (2005a, 2005b) showed that architects' physical models act as assemblages of design possibilities supporting communication within design teams and accommodating multiple concerns. She demonstrated that, when designing, architects create multiple, coexisting, complementary versions of their models. These models do not follow one another in a linear progression instead supporting multidirectional exploration. I suggest that versioning supported by design computing fulfils a similar function extending the capabilities of physical models. Employing processual capabilities of digital modelling and simulation software, designers can simultaneously consider multiple, dynamically-changing relationships between design elements. With the use of these tools, explorations of design-space take form of heuristic performances where designers not only look for suggestive visual patterns as in graphic thinking but also, and especially, for tendencies in the flow of processes they observe. Indeed, I suggest

that, to a lesser degree, the process of graphic and all other types of thinking is also performative. Laseau (2000, p. 8) suggests that

> the process of graphic thinking can be seen as a conversation with ourselves in which we communicate with sketches. The communication process involves the sketched image on the paper, the eye, the brain, and the hand. [...] [A]ll four parts—eye, brain, hand, and sketch—have the capability to add, subtract, or modify the information that is being passed through the communication loop. The eye, assisted by perception, can select a focal point and screen out other information. We can readily accept that the brain can add information. But the other two parts, hand and sketch, are also important to the process. A difference often exists between what we intend to draw and what actually is drawn. Drawing ability, materials, and our mood can all be sources of change. And yes, even the image on paper is subject to change. Differences in light intensity and angle, the size and distance of the image from the eye, reflectivity of paper, and transparency of media all open up new possibilities. [...] The potential of graphic thinking lies in the continuous cycling of information-laden images from paper to eye to brain to hand and back to the paper.

I see this accrual of meaningful change through repetitive engagement as a type of performance that is meaningful not only as a communication loop but as a particular practice with associated skills, habits, tensions, perils and rewards. Without causing a fundamental disagreement with Laseau, my view highlights that during an engagement of paper sketching, useful meanings emerge not from graphics alone as the term "graphic thinking" appears to suggest, but rather from the totality of the sketching performance.

Substituting or, rather, complementing, paper and pen with a computer opens additional possibilities in this performance because digital technologies can introduce greater variations into each cycle and provide broader opportunities for comparative analyses or alternative engagements. Experimentation in form-finding conducted for *The Parasite* project gave an example of how computation can allow designers to engage in performative thinking. Human designers cannot visualise complex, dynamic structures while computers cannot know multiple and unstable meanings of these structures. Time-based procedural workflows, such as those employed during *The Parasite* project, help to combine contributions of machines and humans into flexible and dynamic distributed-intelligence performances able

to suggest unique creative solutions.

Graphic and performative thinking are congruent with form-finding and heuristic approaches because they also rely on spontaneity, serendipity and interpretations of ambiguous feedback. In *The Parasite* project, procedural three-dimensional modelling became similar to sketching with traditional materials such as paper, charcoal or watercolours. Adjustments were visual rather than numeric, the changes were quick, the results were open for multiple inferences and emerging design-moves were often surprising (see fig. 51, p. 186; fig. 52, p. 187 for form exploration or fig. 57, p. 192 for performative sketches of diverging design-paths).

Using time-based processes, we were able to observe the accumulation of change in the structure. The ability to modify, replay, reverse, speed up or slow down the accumulation of change made possible nuanced observation of relationships between elements of the installation. These abilities made a significant contribution to the design process by combining the quickness of change characteristic of sketching techniques with the exhaustiveness of computer-enabled versioning (fig. 60, p. 197 is a representative collection of the various attributes explored and fine-tuned in this manner).

Open-ended, dialogical approach to designing and integration of design computing in support of this process can highlight and encourage collaborative, negotiatory, performative construction of meaning that extends from the pragmatic concerns of the project towards new topics and new actants. While, arguably, every design is an exercise in learning, these relationship-building activities acquire new significance in staging places. If place making is to do with establishing and developing relationships, the educational exchanges that surround every architectural project emerge as primary outcomes of the design process.

For example in *The Parasite* project, computer-assisted heuristic design helped to extend the designers' vocabulary by suggesting avenues for further exploration. During exploratory form-finding, many of the truncated paths that we did not fully develop produced configurations and challenges that invited further exploration. The value of

the form-finding process extended beyond the confines of the project and encouraged me to learn more about cell structures in plants, plastic characteristics of cellular structures and mathematical patterns. In turn, this learning initiated multiple interdisciplinary engagements that provided directions for further work but also attracted attention and encouraged critical evaluation among the audiences typically unconcerned with the architectural problematique. The emergence of these new relationships serves to show how performative interpretation of architectural practice helps to mobilise reflection in designers by extending their awareness towards collaborative opportunities and into new areas of knowing and practice.

Procedural, computer-assisted design techniques integrated into the design process in support of performative thinking contribute to immersive experiential-learning or dwelling in the work. Polanyi argued that (1966, p. 16) "[w]hen we make a thing function as the proximal term of tacit knowing, we incorporate it in our body—or extend our body to include it—so that we come to dwell in it." Versioning and visual evaluation helped us to become intuitively efficient while navigating the design space generated by our models.

For example, in *The Parasite* project, the exercise of distributing the curves (fig. 54, p. 189: 2, 3, 8) that defined the form of the shells served to probe into the affordances of the stairwell. Each run of the script produced a new distribution. Repeated heuristic-experimentation illustrated implications by generating complete structures of the shells for each variation. To study most promising or unusual paths further, we generated multiple versions of the shell structures for each initial distribution of the curves (see fig. 51, p. 186 and fig. 52, p. 187 for examples of such explorations and fig. 54, p. 189 for the technical details of the resulting setup). After a period of oscillation between initialisation, development and evaluation, we were able to uncover fuzzy but recurring relationships between the attributes of each curve-distribution and the performative potentials of the emerging place. After a period of trial-and-error exploration, we learnt to anticipate potential effects of various settings and, guided by this anticipation, could proceed with more focused and directed exploration of implications and

relationships.

Practitioners engaged with time-based creative work are familiar with this form of learning through repetitive exposure to material. For example, Murch (2001) described how engagement with slow analogue editing machines that used rolls of film was beneficial to the creative process. In order to find a required spot, editors had to visually search through the rolls of film. As a result, they developed intimate familiarity with material that lead to unexpected findings and non-trivial choices. Contemporary, non-linear, digital editing-systems support random access to video content. This capability speeds up the editing workflow and is beneficial on multiple counts. However, without counter-measures, it also leads to more rational, autocratic and, therefore, banal choices in editing. In Murch's own words (Murch, 2001, p. 4), "editing—even on a normal film—is not so much a putting together as it is a discovery of path." An attitude to editing as finding was also customary to Eisenstein (e.g., see Eisenstein, 1957, 1968, 1997) and other followers of the montage method in film-making. However, this approach to designing is less familiar to architects who traditionally focused on objects in preference to processes.

The ability to construct custom design tools and the need to rationalise our design decisions for punctualisation into parametric assemblies or programmable algorithms also encouraged reflection on the practical ontology of our simulation system, the scope of participation, the nature of actants and the relationships between them. When designers group and hide operations or delegate tasks to computers they indirectly shape the outcome of the creative process by prioritising relationships between participating actants. This type of reflection is less likely in situations where design computing utilises black-boxed commercial tools only. As Terzidis (2006, p. 20) suggests in his argument for tool-making in preference to tool-using,

> algorithms can be seen as design tools that lead towards the production of novel concepts, ideas, or forms, which, in turn, have an effect in the way designers think thereafter. That way of thinking is incorporated in the next generation of tools that will, in turn, affect the next generation of designers, and so on.

Fox (2006, p. 447–456), reporting on experimental practice-based

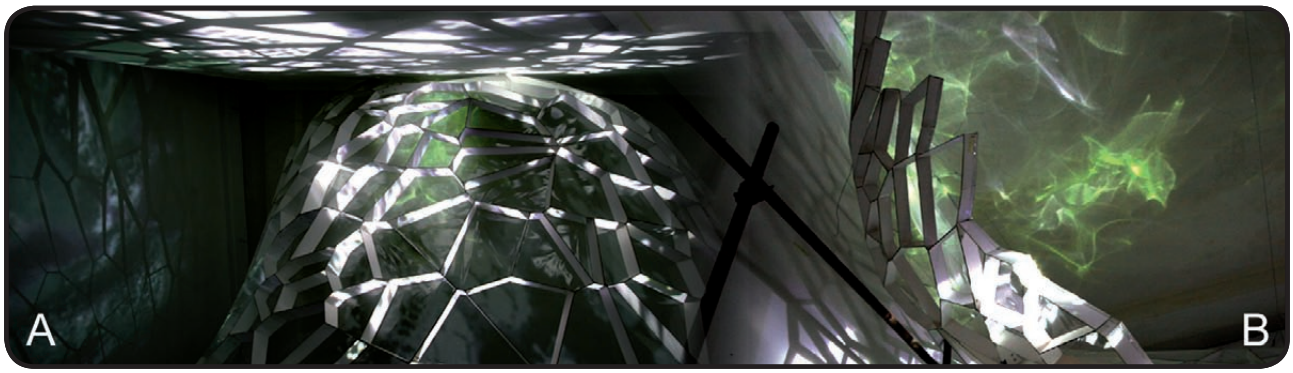


Fig. 61. *The Parasite.* **Light effects. [A] The effect produced by the responsive audio-visual system. We projected moving images onto and through the structure so that image patterns and shadows merged into a continuous field able to integrate bodily movement. [B] Emergent reflections and refractions were purple and green due to the polarizing effect of the transparent-plastic cell-skins. The colour depended on the orientation of the cell-skin in relationship to the projector beam. (location photographs)**



Fig. 62. *The Parasite.* **A team member assembles and adjusts the interactive audio-visual system. (location photograph)**

teaching of "interactive architecture", also argued for the benefits of concurrent design- and tool-development. He argued that simultaneous evolution of design outcomes and design tools helps creative practitioners to integrate knowing derived from multiple, conventionally dissociated domains. These examples demonstrate that rather than being a mind-numbing constraint on thinking and creative practice, design computing, if exploited in its exploratory potential, is capable of unlocking new outlets for creativity while raising important philosophical and cultural concerns relating to the very foundations of design practice.

The intensive exploratory, in-performance learning, necessary for the project that integrated artificial creativity, helped to erode designers' stereotypes and assisted in reframing design challenges. Designers develop their visions of the future by associating existing patterns with new situations. While such patterns are essential for the creative process, they can become clichés that prevent innovation. Professionals become unobservant as their experience grows and the need to act assuredly and quickly casts new situations in terms of the already-familiar. In Schön's (1983, p. 61) words,

> as a practice becomes more repetitive and routine, and as knowing-in-practice becomes increasingly tacit and spontaneous, the practitioner may miss important opportunities to think about what he is doing. [...] And if he learns, as often happens, to be selectively inattentive to phenomena that do not fit the categories of his knowing-in-action, then he may suffer from boredom or "burn-out" and afflict his clients with the consequences of his narrowness and rigidity. When this happens, the practitioner has "over-learned" what he knows.

An important source of innovation is in the breaking of the familiar



Fig. 63. *The Parasite.* **Dynamic light and shadow patterns produced by the installation. The image shows a conflation of effects produced by interactive-video projections, shadows cast by cell-walls and transparent cell-skins, lines on skins showing numbering and triangulation, refractions and reflections. (location photograph)**

patterns through estrangement or reframing and I suggest that utilisation of design computing in open-ended design-exploration greatly facilitates this approach. For example, our early-development sketches for *The Parasite* demonstrate design moves that considered placement of video projections among architectural structures. These sketches featured conventional, rectilinear boundaries for the screens, assigned one screen per projector and incorporated without questioning many other customary solutions. Later in the design process, the computer-generated, found, curvilinear and cellular forms of our shells forced us to question the utility of conventional moving-image presentation. After reflection on the reasons of integrating moving images with architectural structures, we abolished flat, rectilinear projection-areas, allowed overlapping projections and permitted all types of actants to intersect with the projection beams. These decisions resulted in an innovative design that exposed limitations inherent in traditional solutions for moving-image projections. This exposure of limitations was beneficial because the ubiquity of rectilinear





Fig. 64. *The Parasite.* **Emergent, dynamic reflection and refraction in patterns produced by the installation. The contrasting green and purple are close to the on-location perceptions. (location photographs)**

flat-surface projections makes it difficult to realise that their habitual characteristics do not define all available, potentially useful alternatives. By offering an unusual solution, we also triggered various mutually-educational dialogues with other stakeholders including projection-equipment manufactures, exhibition designers and lighting specialists. Interchange between these participants, provoked by an experimental design-move, motivated further development of technical and expressive characteristics.

The presence of a functioning audio-visual field during the performance-like construction of *The Parasite* also proved educational to the design team. Projected moving-images fell on diverse architectural forms and moving visitors (see fig. 61, p. 207; fig. 65, next page; fig. 69, p. 214; and fig. 70, p. 215). Given the novelty of the structure and the visual content, as well as the innovative character of their integration, the prolonged exposure to a variety of conditions emerging at different times of day and during different public-events resulted in various found effects that nobody could have imagined, predicted an-



Fig. 65. *The Parasite*. An architect and a volunteer assemble one of the patches of the outer shell in the cellar of the museum. (location photograph with wireframe-model overlays)

alytically or simulated in software. For example, to our surprise, the light cast by the projectors onto and through the plastic skins of the cells became coloured in either green or purple (e.g., see fig. 61, p. 207). This reflected and refracted light assembled into intricate figures that simmered and warped in response to the swaying and vibration of the suspended structure. Similarly unpredictable were the complex shadowing-effects produced by multiple light sources interacting with several layers of permeable cellular shells, surrounding opaque and translucent walls, scaffolding structures and moving visitors. While it is possible to learn about such emergent effects through scale modelling, simulation and the study of precedents, none of these learning methods can replace several-week long on-site presence. By installing the audio-visual, interactive system early in the process, the design team gained opportunities to observe the performance of the installation in different lighting conditions and during different social circumstances. The social context ranged from large-scale evening shows attracting hundreds of people to prolonged quiet morning hours with only rare, solo visitors, to eerily empty night settings usually completely devoid of people. Prolonged involvement with the installation allowed the design team to accumulate a variety of practical observations and emotional experiences that could contribute to their future design work or even inform their general appreciation of architecture and art. In addition to my personal learning experiences,

many other collaborators have also confirmed the educational value of the performative engagement with the installation.

Unlike artisans, architects traditionally work away from the physical components of their designs and plan materialisation through simulations that include drawings, specification and models. They communicate their ideas to the builders via geometric representations. Procedural techniques introduce new levels of indirection between architects and artefacts in return for controlled access to more-complex geometries. The traditional worry in this situation is that indirect relationships to artefacts can stifle creativity.

However, utilisation of computer-aided manufacturing addresses these concerns by reconnecting architects with performances of materials and the particularities of construction processes. This closer relationship between architects and artefacts leads to greater awareness of alternative design-opportunities and their implications. For example, Kolarevic (2003, p. 8) insisted that "by digitally producing, communicating and controlling the information exchanged between numerous parties in the building process, architects have an opportunity to place themselves in a central, key role in the construction of buildings [...]". The experience of architects utilising design computing and finding that computer-aided manufacturing encourages deeper and more-direct involvement with materiality of architectural output moves architectural design closer to McCullough's (1996) understanding of craft as an embodied practice enhanced by the precision of computers (e.g., cf. Aish, 2006). This understanding of design computing repels the opinion that computer tools confine architects to abstract, immaterial, arbitrary and, therefore, frivolous virtual domains.

My experience during *The Parasite* project confirmed that digitally-controlled fabrication and prototyping could reconnect designers with the minutiae of materialisation (see fig. 65, previous page for the impression of the structure during construction, fig. 66, next page for the images of building details in various stages of manufacturing and fig. 72, p. 217, fig. 73, p. 217, fig. 74, p. 218, fig. 75, p. 219 for images showing the cell-assembly process). In this project, our roles as architects



Fig. 67. *The Parasite*. A fragment of the outer shell in the stairwell. The view shows the scaffolding used for construction and the light effects from the projected images. (location photograph)

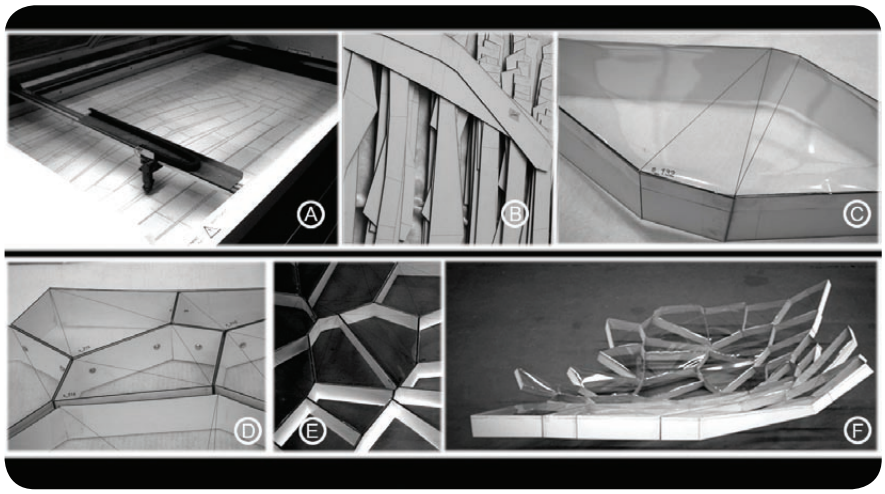


Fig. 66. *The Parasite*. Strips, cells and patches. [A] A cardboard sheet cut and scored by a laser-cutter and sorted for assembly. [B] Cardboard strips before folding into cell-walls. [C] A cell with a cell-skin attached. [D] Cells assembled with hot-melt glue and reinforced with bolts and nuts. [E] A fragment of a cell-patch. [F] A cell-patch. To fit through the doors in the museum building, we split the outer shell into 14 such patches. (photographs)

extended to the design of various processes of production in collaboration with multiple other stakeholders. Given the innovative character of the project, we would not be able to delegate these tasks even if we wished to. The resulting closer relationship between designers and architectural artefacts (fig. 67, this page) encouraged learning; necessitated continuous innovation in construction, logistics and management; promoted communication with other participants; and generated new creative-ideas.

Apart from inducing the architects to learn in-performance, the integration of design computing in the open-access construction process during *The Parasite* project also helped to advance theoretical and practical knowing of various other participants. For example,







Fig. 68. *The Parasite*. Events and atmosphere during the opening of the Biennale. The images show various participants of the projects mixing with each other, artists and visitors. <top> Party. <left> Singing together at another installation. <right> Crowds at the opening. (location photographs)

the project educated the people who encountered it on-site by making apparent the novelty and unexpected implications of our production techniques, visually demonstrating emergence of patterns in complex cellular-systems, highlighting performative characteristics of our structures and uncovering hidden affordances of the museum

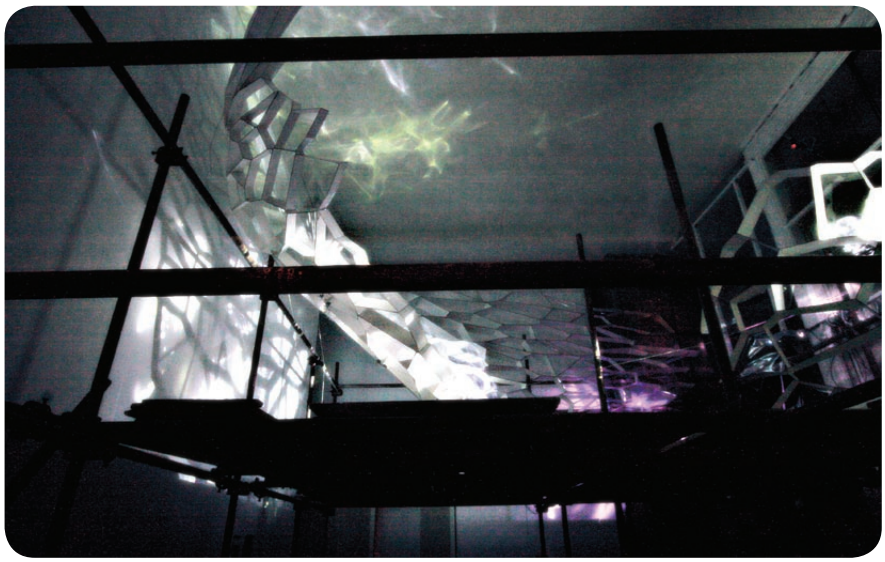


Fig. 69. *The Parasite*. Scaffolding, part of the shell structure and the visual effects of the interactive projections. We used the audio-visual field to announce the hidden presence of actants participating in the construction of The Parasite. Often, scaffolding hid most of the building activity. During these periods, changes in mood expressed in sound and reflected light indicated the presence of hidden workers and encouraged the visitors to stop, observe and ask questions. (photograph)

places.

Experiences of many people during *The Parasite* and other case-studies confirm that contemporary design-computing can usefully support graphic or visual thinking by adopting and extending the capabilities of traditional tools. In addition, computing affords collaborative and in-the-field experimentation with dynamic, enacted content. Regarding the impacts of these additional capabilities, I suggest that it might be useful to extend the notion of graphic thinking into performative thinking. Integration of purposively cultivated and computer-assisted performative thinking into designing can extend creative capabilities of architects by supporting negotiatory, experimental and experiential learning-in-practice.

IV.2.7 Campaigning

Accessible design and construction processes enabled by computing can afford wide possibilities for campaigning, witnessing and translation through the framing of development and construction as performances. For example, during *The Parasite* project, we found that framing construction as computer-assisted performance helped creative effort by involving many unusual actants in the process of communication and mutual learning.

To emphasise the performative character of construction, we installed and activated the audio-visual system in its final location, the



Fig. 70. *The Parasite*. Scaffolding lit by the visual effects of the interactive projections. Below is the passage into the main hall and performance space below. (photograph)

stairwell, early in the process. It functioned throughout construction, casting images onto and through the scaffolds, onto the builders and the shell patches under assembly (fig. 65, p. 210; fig. 69, previous page; and fig. 70, this page). Within the stairwell, responsive visuals and sounds announced that the location hosted unusual activity, created intrigue and provoked reaction in the visitors. When the construction period ended, we adjusted the system to suit the final configuration of the installation and it remained operational for the full duration of the Biennale.

The process of materialization, exposed by this set-up, pulled in many different actants. The extended performance of building physical structures in existing, inhabited places helped to generate relationships between participants. Many of these relationships were educational, emotional and long lasting. According to my observations and informal interviews, such characteristics as the novelty of the concept and the appearance, the beauty of the sculptural form, the impressive size of the suspended structure or the unusual visual similarity with



Fig. 71. *The Parasite*. Team members separate cell walls from automatically pre-cut sheets and sort them for the subsequent assembly. This work takes place in the main exhibition hall where other artists also assemble their works. (location photograph)

living organisms became valuable as claims and affordances that attracted new participants to the project, sometimes resulting in persistent and rewarding involvements.

Many new supporters among the museum employees, volunteers and visitors offered or agreed to help in the collaborative effort of construction. Consequently, *The Parasite* engaged many unlikely participants that do not commonly have opportunities to participate in the aspects of place-making as experienced by artists, architects and builders. While by that stage the structural layout of the installation had already been well-defined, the place it intended to engender was yet to acquire its peculiar and polysemic form. Engagement in designing as performative place-making provided the incoming participants with opportunities to learn about the project and influence its integration into the fabric of the museum. Altogether, the project attracted about 70 actively-helping participants many of whom stayed associated with design and development over a long time. Within this temporary community, expert designers had to act as communicators,



Fig. 72. *The Parasite*. Team members sort cells skins. (location photograph)



Fig. 73. *The Parasite*. Sorted cells skins organised according to the assembly logic. (location photograph)

catalysts, facilitators and inspirational leaders rather than tyrannical, mysterious and controlling authors. Prolonged collaboration helped participants to share knowing and emotions thus contributing to the emergence of lasting and enriching social links (e.g., see fig. 68, p. 213 that indicates the mood of comradeships shared by many actants involved with *The Parasite*).

Openness of designing and making helped in campaigning for the acceptance of our creative effort. Through practical engagement, par-

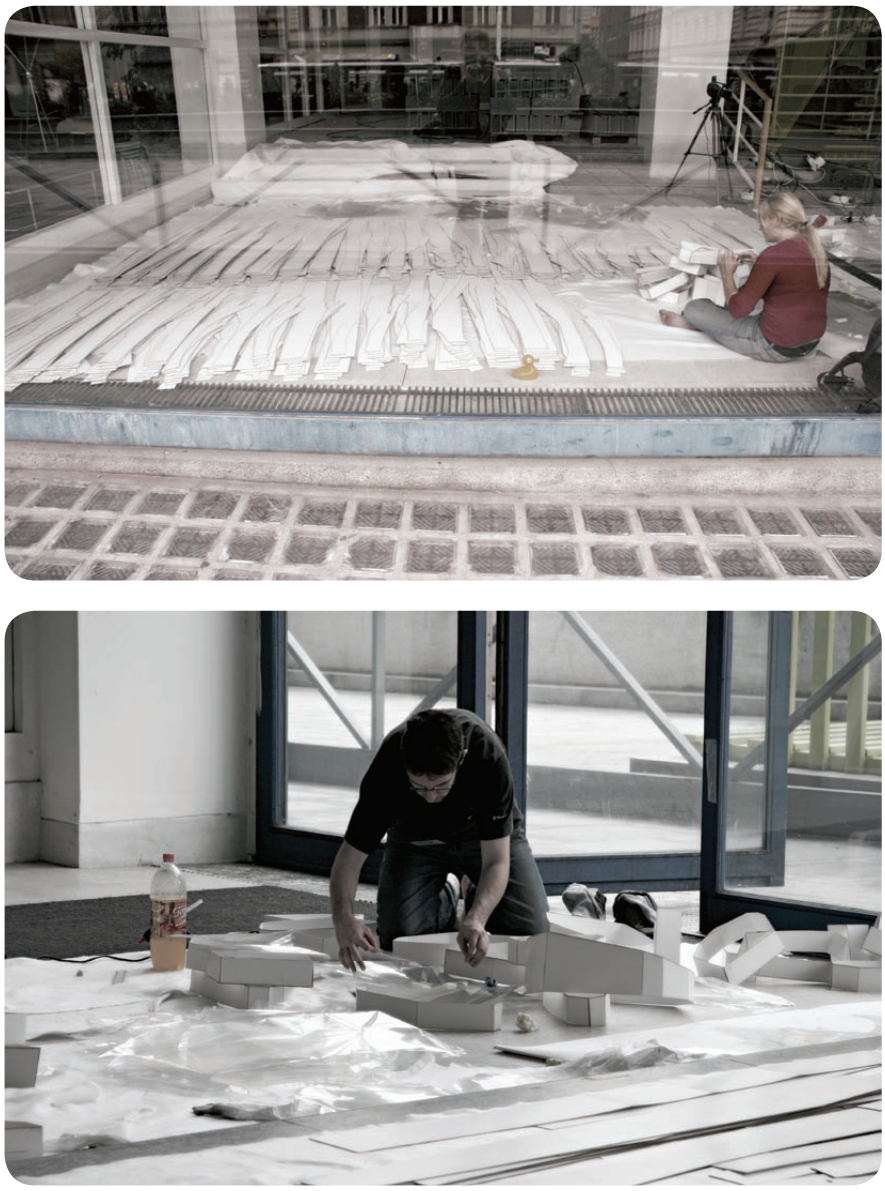


Fig. 74. *The Parasite*. Sorting and assembling of cells walls in the entrance hall adjacent to the stairwell <top> The image shows cell walls sorted on the floor of the entrance hall as seen from the street outside. The image also shows a video camera recording time-lapse video for documentation. <bottom> A team member matches the cell skins to the cell walls and determines the intended topology of the cells. (location photographs)

ticipants began to feel ownership over the project and learned to appreciate it. Different participants could appreciate the project in very different ways but the open attitude to the project's meaning made this diversity acceptable and rewarding.

IV.2.8 Polyphony

Conventional architectural-representations often discourage participation because they are only understandable to trained and experienced professionals, and even among professionals, disagreements and misreadings are common. Computer-generated representations can suffer from the same drawbacks. However, extra capabilities af-



Fig. 75. *The Parasite.* Assembling of cells in the entrance hall adjacent to the stairwell and visible from the street through a glazed wall. <top> Cells are taken from the floor where they are sorted, brought to the tables, bent and glued into shape. (location photographs)

forded by computation support generation of multiple representations can more flexibly correspond to the needs and backgrounds of stakeholders. Flexibility in representation is essential for the success of multi-directional in-design communications. New channels of communication supported by multiplicious, goal-specific, flexible, on-demand representations enabled by computing encourage collaboration and enable contributions that would otherwise be unlikely.

The emphasis on multiplicity in representation continues the tradition established in cinematic montage (Eisenstein, 1957, 1968) and approaches utilising juxtapositions of discrete elements or recombinations of parts in other cultural practices such as carnival, theatre, jazz or literature. Montage-like, polyphonic representation is useful for place-making because it emphasises their multiplicious, participatory and constructed character. Polyphonic representation, as montage in cinema, allows participants to experience the process of assembly and partake in the emergence of meaning.



Fig.76. *Shenmue II*. Mini-interactions. Ryo receives advice from the keeper of Fu Hoi Diner. <left> Ryo approaches. <middle> Camera adopts over-the-shoulder position as Ryo asks for directions. <right> The camera switches into a reverse shot as the waitress replies. (screen captures)

Computing supports many types of representation impossible in traditional media or extended in flexibility and reach in comparison with traditional practices. Examples include parallel representations of data in differently-dimensioned spaces as well as diagrammatic, real-time and distributed representations. In this section, I emphasise the capabilities of real-time, navigable environments as multi-media hosts capable of incorporating multiple viewpoints and constructing multiple experiential-interpretations of places using avatars, multiple cameras and audiovisual effects bound by cinematic, narrative structures.

The existence of versatile expressive-capabilities evident in computer games (e.g., see my example of *Shenmue II*, next page et seq.), and the examples taken from my case-studies (e.g., see my examples from *Virtual Cuthbert Hall* and *Virtual Braunstone* later in this chapter), contradict the widespread understanding of virtual environments as neutral and objective, emphasising instead their constructed nature. I argue that this constructed nature is identical in character to the constructed, relational character of other places. This continuity in place formation between so called physical and virtual environments re-

veals new expressive capabilities for open, multidirectional discourse in support of mutual learning and collaborative creativity.

For example, *Shenmue II* provided several simultaneous modes of representation that dissolved a singular mode of access. This polyphonic portrayal staged representational events as dramatic place-making devices supporting multiple conflicting or complementary interpretations.

In **free-exploration mode**, players could roam freely or choose destinations and walk towards them. Players had to travel and explore to progress through the game. Active search and experimentation allowed them to complete missions and discover new narrative units distributed between places, objects and non-player characters. Exploration helped players to learn the geometry of the game-world and observe how places changed depending on the time of day.

During **mini-interactions** or "lexia" (Fencott, 2001, pp. 90–99), the game briefly assumed control over the protagonist, Ryo, as he spoke to non-player characters or manipulated objects. These simple interactions contributed to the constructions of the in-game city by exposing its petty thugs, dodgy dealers and occasional kind souls (fig. 76, previous page).

Cut-scenes portrayed events requiring precise timing or direct bodily contact. During cut-scenes, players did not have control over events and could only observe the proceedings. Cut-scenes utilised dramatic transitions between shots and bold camera movements. Designers relied on this extended cinematic language to show high-intensity, fast-paced and often geometrically complex events (fig. 76, previous page).

During **Quick-Timer Events**, the player had to press challenging sequences of gamepad buttons in order to take Ryo through fast-paced challenges such as chases. Quick-Timer Events demanded high concentration, good reaction times and excellent coordination. Quick-Timer Events created dramatic effect by overloading players with information and basic motor challenges. Anxiety over failure created experiential representations of tunnel vision—a narrowly functional engagement with the environment (fig. 78, next page).



Fig. 77. *Shenmue II.* Cut-scene. Wong steals the bag. <left> Ryo prepares to defend Wong who pretends to be in trouble. <middle> Before the ensuing fight, Ryo puts the bag on the ground. Wong tosses it to his friends and they run away. <right> Ryo chases the thieves. (screen captures)

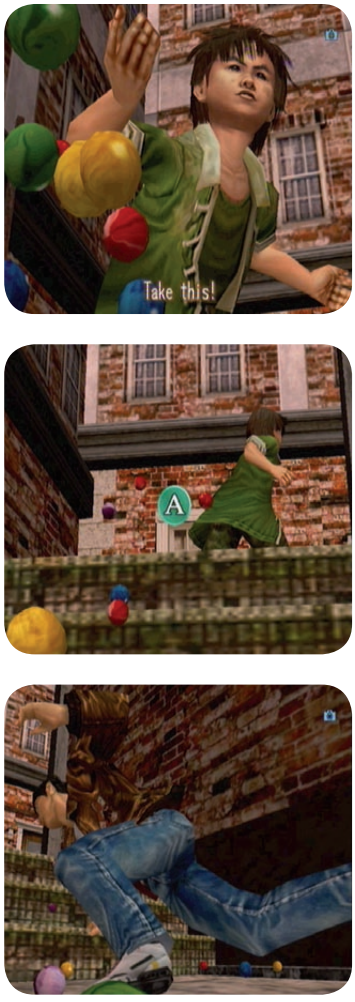


Fig. 78. *Shenmue II*. Quick-Timer Event. Wong's escape. <left> Wong tosses marbles on the ground to hinder the chase. <middle> The game offers a key to press. <right> The player fails to press the keys as required. Ryo falls and Wong escapes into a backstreet. (screen captures)

During **battles**, players had to fight with non-player characters. *Shenmue II* used battles to resolve narrative sequences and introduce characters. Their increasing difficulty both matched and challenged the increasing capabilities of the player and Ryo. Free battles contributed to the construction of the player, the avatar, the protagonist and the game-world. At the same time, free battles in *Shenmue II* strongly privileged the relationship between Ryo and the other (attacking) non-player characters while allowing the location to serve as a comparatively passive backdrop (fig. 79, next page).

Mini-games constituted the most abstracted type of agency in *Shenmue II*. These games added to the character of places such as pubs but did little for interpretive presentation of the protagonist or the game-world.

In additional to the potential given by the co-existence of multiple representations, another powerful resource for the support of polyphony arises from the narrative capabilities of avatars. I suggest that association with stakeholder personalities expressed as avatars can help participants to experience a variety of worldviews. Even though this as-the-other access is far from a straight transposition into another being, it does provide unique ways of appreciating the experience of others. I suggest that acting on behalf of and in the presence of an avatar can encourage learning through experimentation and help participants in design situations to appreciate complex, emotional and moral choices encountered by others.

For example, *Shenmue II* makes players act through and in-the-presence-of Ryo, an avatar and a fictional hero. He is a young man with a distinct character, personal history and nationality. He appears as a fully-autonomous agent with privately-held information and egocentric goals. Ryo can make idiosyncratic decisions and act independently from players. Players have to experience his behaviour that might be unusual or uncomfortable for them and have to cope with the consequences.

During my play, I found that I did not share with Ryo his single-mindedness and disinterest in the environment or his readiness to face danger. In games, simultaneously threatening and tempting



Fig.79. *Shenmue II*. Battle. Ryo confronts the thugs. (screen captures)

communications often lead to further challenging adventures. Thus, my intuitive reaction to new encounters was that of caution. I wanted to behave differently from Ryo who, I thought, was annoyingly illogical and naïve. This misalignment helped to indicate that Ryo had independent personality. To cope with the challenges of the game-narrative, I had to discover Ryo's ways to inhabit the game-world and learn to predict his behaviour. Ryo's behaviour provoked me to consider actions that would normally be against my temperament or beyond my knowing. I could control Ryo, yet the game could withdraw this control and I often did not know how he would react to an encounter. The tension of this anticipation was akin to the proairetic suspense in literary or cinematic narratives. *Shenmue II* modulated this effect of suspense by varying the length of out-of-control periods that sometimes were only tens of seconds long and arranging the rhythm of their occurrence. Many of these out-of control moments occurred without warning, often in the midst of high-tension action-sequences that required maximum levels of mental concentration. By making Ryo perform actions that I did not plan and sometimes did not fully understand, each out-of-control moment modified my situation in the game-world leaving me to deal with, and learn from, the consequences of the enforced actions. The emotional involvement that resulted from this dialogic relationship between the player and the protagonist was different from that in a film or a book where no control is possible and the spectators/readers, however strongly they feel for the characters, have to persevere as largely-passive onlookers. The lack of agency in these media dissolves the sense of personal responsibility. By contrast, I suggest that the enacted relationship between the player and the protagonist possible in virtual worlds is a resource for learning about the multiplicity of places and a promising direction for further work.

Repurposing the lessons learned from the study of computer games and cinema, we initiated the *Virtual Cuthbert Hall* project in order to explore the potential for polyphonic representation and integration of location-driven narrative. This case-study demonstrated that multiple presentation modes could usefully co-exist and give ac-

cess to additional expressive resources. Experimentation with *Virtual Cuthbert Hall* confirmed my earlier observations that highlighted the impossibility of neutral or natural access to virtual environments. *Virtual Cuthbert Hall* included three types of presentation devices.

Avatar-bound type included virtual cameras, fixed or mobile relative to the experient's avatar. The experient could control the avatar with mouse movements and key presses. Consequently, the experient also indirectly controlled the cameras. The *Virtual Cuthbert Hall* framework linked the behaviour of the avatar-bound cameras to the dramatic requirements of performative situations. We equipped the avatar with several cameras. The vocabulary included following, circling, panning, dollying and zooming. We related movement of the avatar-bound cameras to the experient's input and automated transitions between cameras. Contrasting cameras allowed interpretive portrayal of the avatar in response to the performative context. With these capabilities, we could assemble sequences of shots with distinct styles and varied rhythms. For example, we could contrast a low-angle frontal shot with a mid-distance behind-the-shoulder shot and have a wide establishing shot followed by an extreme close-up. Using multiple avatar-bound cameras also afforded employment of real-time shot sequences in support of narrative tasks such as staging of continuity-style dialogs or establishing meaningful relationships between objects and events. For example, when narrative required, an avatar-bound camera could temporarily adopt a low position in order to bring into frame an architectural feature such as a cross on a church spire.

Geography-bound presentation-devices permitted experients to navigate and engage in the events while the system took control of camerawork. These presentation devices responded to positions, orientations, movement and visibility of actants. They also provided support for narrative and drama. We made geography-bound devices respond to the symbolic content of regions, landmarks and paths. A camera could spend more time around a dramatically significant object, show two narratively-linked objects in succession or visually link two apparently-unrelated objects. These presentation devices sup-

ported distinct moods assigned to locations and were able to adjust in order to describe the geometry of the site. For example, depending on the position of the avatar, cameras of this type could circle a focal point, glide along a curving pergola or reach into a gallery through a row of columns.

Pre-scripted type included events triggered by the user but unfolding with little or no direct user-input. Events of this type consisted of partially pre-scripted actions of animated cameras, lights, textures, effects, sounds and non-player characters. Experients activated these events by setting off spatial, mobile and conditional triggers. Limited in interactivity, these events could fully exploit the descriptive power of cinematic language and were useful in punctuation and interpretation of the interactive flow.

In order to illustrate the polyphonic, expressive capabilities given by integration of narrative, drama and cinematography, I include three sequences from the *Virtual Cuthbert Hall* project. For convenience and cross-referencing, I gave these sequences distinct titles. However, in the virtual environment they did not have any particular framing distinguishing them from the interactive flow. While experimentation in the *Virtual Cuthbert Hall* project developed examples for all three types of presentation devices as described above, we particularly focused on the polyphonic hybridity emerging from the integration of pre-scripted and interactive events. The examples below reflect this focus.

For example, The Novice/Welcome sequence (from fig. 86, p. 228, to fig. 95, p. 231) took place at the very beginning of an experient's encounter with *Virtual Cuthbert Hall* and achieved a number of place-constructing, interpretative moves. It emphasised the moment of arrival and cast the college Gate as a threshold identifying the boundary between the college and the city and ritualising the act of entry while linking the location to a memorable event and a memorable character. The sequence created suspense by deliberately withholding visual and relational information. At the beginning of the sequence, the camerawork did not disclose the identity of the porter or allow the approaching experient to see into the courtyard. By employing this

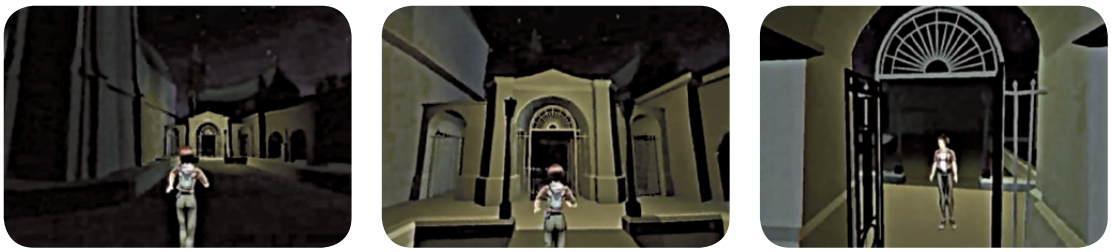


Fig. 80. *Virtual Cuthbert Hall.* Welcome, part 1 (fig. 132, p. 324: <2>). <left> Attracted by the Porter's Gate at the focal point of the plaza, the experient approaches and triggers a pre-scripted event. <middle> The loud sounds of the street become subdued. The gate grows large in the frame. <right> The camera enters first: a counter-shot directs the experient's attention to the street behind. (screen captures)



Fig. 81. *Virtual Cuthbert Hall.* Welcome, part 2 (fig. 132, p. 324: <2>). <left> A gowned figure crosses the frame. The framing is tight to hide the identity of the character and the inner-College architecture. <middle> The gowned figure turns the corner moving towards the avatar. <right> A reverse shot from the avatar's point of view showing the menacing figure approaching. (screen captures)



Fig. 82. *Virtual Cuthbert Hall.* Welcome, part 3 (fig. 132, p. 324: <2>). <left> The camera shows the reaction of the avatar as the gowned character curtly enquires about the reasons for the late arrival. <middle> Reverse shot shows the avatar confronting the porter. <right> The porter turns to go away into the college. (screen captures)

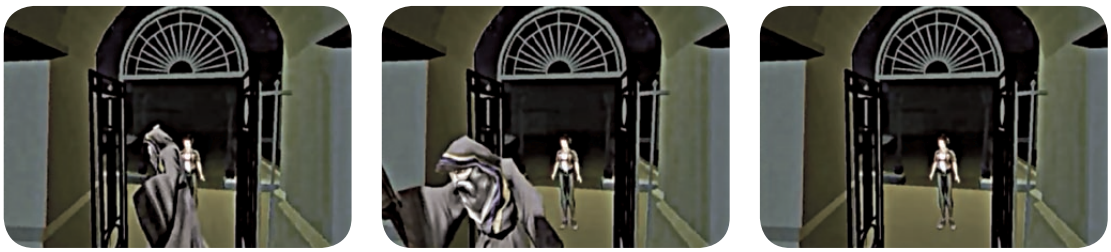


Fig. 83. *Virtual Cuthbert Hall.* Welcome, part 4 (fig. 132, p. 324: <2>). <left> In another reverse shot, the camera shows the porter retiring. <middle> The imposing Gate frames the avatar as the porter leaves. <right> Another reverse shot and the experient regains the control. (screen captures)



Fig. 84. *Virtual Cuthbert Hall*. Novice, part 1 (fig. 132, p. 324: <1>) <left> In the continuation of the Welcome event, the camera pans slowly waiting for the experient to move in. <middle> The experient navigates the avatar into the college. <right> After several steps experient again loses control, and camera jumps up high showing the avatar as a tiny figure in the depth of the vast courtyard. (screen captures)



Fig. 85. *Virtual Cuthbert Hall*. Novice, part 2 (fig. 132, p. 324: <1>) <left> The camera pulls out further revealing the dark and empty inner college. <middle> The shot continues until all of the college courtyard is in view. <right> The camera cuts back to the third-person point of view and the experient regains control. (screen captures)

camerawork, we intended to make experients undergo a somewhat unnerving entry ritual familiar to many college visitors. Constrained visual access in this episode provides an example of how camerawork in a virtual environment can achieve a dramatic effect by delivering information according to the narrative logic and not to the experients' in-the-moment impulses (fig. 80, previous page; fig. 81, previous page; fig. 82, previous page; and fig. 83, previous page). The sequence demonstrated to the experient that porters guard the Gate to the college, that visitors to the college need permission to enter and, consequently, suggested the character of the college as a place bound by idiosyncratic rules. The end of the sequence suggested the visitor's insignificance in comparison to the grandeur of the college by contrasting previous, confined camerawork with sudden switch to very wide bird-view shots showing the visiting avatar as a tiny figure in the background (fig. 84, this page: <right>; fig. 85, this page). In terms of character development, the sequence introduced the avatar and converted it from a stranger to a visitor casting it as the addressee in the first part of the sequence and as the protagonist in the second part of



Fig. 86. *Virtual Cuthbert Hall.* **An excerpt from the Debate, part 1 (fig. 132, p. 324: <10>). We situated the Debate event in the proximity of the Dining Hall colonnade. The establishing shots put the colonnade into a relationship with the surroundings, provided views through the arches into the courtyard, and introduced the busts within the colonnade. After the introduction, the event presented close-ups of the busts that seemed to be arguing with each other. <left> A wide establishing shot shows the avatar at the beginning of the colonnade and two of the busts on the background. <middle> Another wide shot that relates the avatar, the colonnade and the courtyard. <right> One of the close-up shots focuses on a bust. (screen captures)**

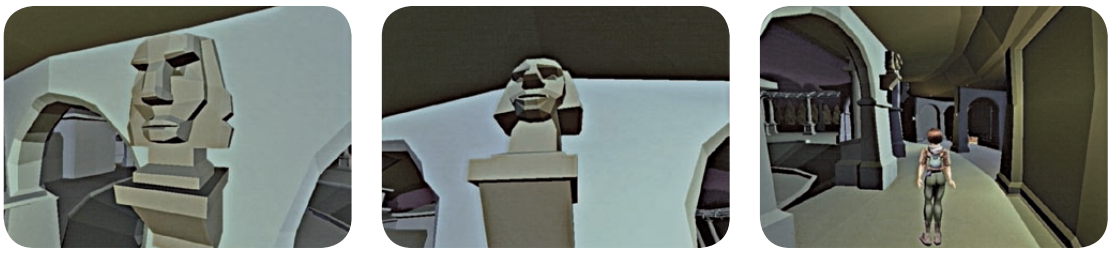


Fig. 87. *Virtual Cuthbert Hall.* **An excerpt from the Debate, part 2 (fig. 132, p. 324: <11>). The experient triggered this event at the perimeter of the colonnade. A geography-bound camera showed the avatar walking from one end of the colonnade towards its centre. At the midpoint, the debate between the busts interrupted free navigation. When the experient regained control, the system already relocated the avatar to the opposite end of the colonnade. <left> A close-up shot removes all distractions, makes the experient notice the bust and focus on its detail. <middle> Another close-up shows the second bust. The busts appear to be in dialogue. <right> The concluding shot shows the avatar standing at the opposite end of the colonnade looking in. Experients see the scene where the dialogue took place from a reverse angle. (screen captures)**

the sequence. Finally, the sequence suggested the emotional character of the events by showing the reactions of the avatar (fig. 82, p. 226: <left>) and, utilising music and lighting, contributed to the atmosphere of the college that appeared as a dark, empty and mysterious place. This characterisation illustrates the flexibility and plurality of directed and ambiguous communications possible in virtual environments.

In another example, while exploring *Virtual Cuthbert Hall*, experients could unexpectedly encounter the Debate sequence. Taking place in the colonnade, this sequence also performed a number of place- and narrative-constructing moves. The sequence took place when the experient approached the colonnade for the first time. Its camerawork diverted the experient's attention from the layout of the courtyard and deliberately obscured geometric relationships between



Fig. 88. *Virtual Cuthbert Hall.* **An excerpt from Choir Rehearsal, part 1 (fig. 132, p. 324: <12>) event <II>. The initial shots of the Choir Rehearsal event showed the avatar overhearing a choir rehearsal and directed the experient's attention to the window above the colonnade. The avatar's glance away from the window towards the Porter's Gate area introduced the direction from which intruders emerged. The camera then presented the intruders' approach from a first-person point of view. It started in the street outside and glided close to the ground through the gate into the main courtyard. The sound of the College Choir singing Beethoven accompanied the camera's approach. At the beginning of the event, a classical chorale mixed with disturbing sounds of a street brawl. When the camera passed the gate, the mix changed as the more subtle sounds of the college-interior become audible. The approach of the intruders audibly and visually linked the city area with the inner college and, at the same time, compared these locations as places with contrasting atmospheres and inhabitants taking opposing sides in a conflict. <left> The avatar's gaze draws attention to the window above. The sequence suggests the relationship of conflict between the singers and the intruders. <middle> The intruders/camera begin from the street. <right> The intruders slowly approach the Porter's Gate into the courtyard. The camera traces a wavy path suggesting hesitation before the intruders decide to force themselves in. (screen captures)**



Fig. 89. *Virtual Cuthbert Hall.* **An excerpt from Choir Rehearsal, part 2 (fig. 132, p. 324: <12>). During the culmination of the chorale, the intruder camera jump-cut towards the window and showed a close-up of broken glass, synchronised with the sound of the shattered window-pane interrupting the choir session. The shouts of a scuffle followed rising until the narrative sequence reached its conclusion. The avatar inside the court remained a passive onlooker. However, its gaze drew attention to the window and the rehearsal beyond, motivated the cut to the outside and then followed the advancing intruders, adding to the feeling of presence of these invisible beings. <left> The avatar's gaze indicates the presence of intruders behind her, at the Porter's Gate. <middle> Jump-cut towards the window. The room behind the window is the source of the singing. <right> In the emotional climax of the event, the music reaches crescendo and the singing breaks off after an intruder's stone shutters the window. (screen captures)**

architectural elements (fig. 87, previous page). This temporary discontinuity in the experient's impression of the area affected the subsequent free-exploration by encouraging further visits. Experients had to return to the colonnade if they wanted to obtain a geometrically coherent image of the place or find out more about the busts. The sequence also emphasised the narrative significance of the busts, gave them history and associated them with a dramatic, emotional event. Through this narrative treatment, the otherwise unassuming busts emerged as memorable landmarks prominent in the geography of



Fig. 90. *Virtual Braunstone*. Opening Sequence, image 1. The opening screen. We used the opening screen to mark the entry into Virtual Braunstone, suggest the variety of material within it and give background information. When the experient pressed the Space key, the screen dissolved and the opening sequence began. The opening sequence in Virtual Braunstone began with a machinima, rendered in real-time but fully pre-scripted. (screen capture)



Fig. 91. *Virtual Braunstone*. Opening Sequence, image 2. The initial static view showing the main entrance into the building. [fade out to black] (screen capture)



Fig. 92. *Virtual Braunstone*. Opening Sequence, image 3. [fade in from black] The camera turned to the right and zoomed to find Tina, with a pram, moving towards the entrance of the health centre. The shot traced the path to the entrance, showed the location of parking, emphasised the distinction between the walkways and the road, illustrated the scale of the building and related it to the surroundings. It also introduced the protagonist, Tina, a young mother with a child. (screen capture)

the college. In terms of character development, the sequence cast experients as witnesses of the event, further diversifying their relationship to the conceptual, geometric and narrative actants of the virtual environment.

The final example, the Choir Rehearsal sequence, stretched from the city entrance to the college and across the full expanse of its courtyard. By stringing together narrative events, supported by music, sound effects, purposeful lighting and custom camerawork, the sequence associated and contrasted locations that a normal mode of access utilising first- or third-person camera would leave unrelated. After the sequence, a number of locations and objects linked together into meaningful relationships acquiring particular memorable significance. For example, the avatar's gaze and the framing of a dedicated shot drew attention to the Dining Hall window that was previously unnoticeable and narratively meaningless (fig. 88, previous page: <left>). The sequence also highlighted and positioned performative activities typical for the place. For example, the sequence associated the activity of singing with the Dining Hall educating experients about the environment and establishing a performative relationship that the narrative development could exploit in the future.

The example sequences demonstrate how performative, situated

events and targeted representations can create multiple, alternative, complementary or contrasting places. For example, as experients approached the *Virtual Cuthbert Hall* colonnade as seen in fig. 89, p. 229: left, we could draw attention of one person (fig. 88, p. 229: left) to the Dining Hall window, but direct the gaze of another person to the colonnade busts (fig. 86, p. 228 and fig. 87, p. 228). Thus, two experients could receive different impressions of the same location effectively finding themselves in alternative, yet partially coincidental places. In another example, in *Virtual Cuthbert Hall*, the colonnade hosted such contrasting events as a debate of academics and a violent brawl. The virtual environment became more meaningful, memorable and engaging as experients discovered new, surprising and contrasting affordances. The events of *Virtual Cuthbert Hall* illustrated daily and seasonal cycles as well as historical events, sampling the temporal multiplicity of the place.



Fig. 93. *Virtual Braunstone*. Opening Sequence, image 4. The end of the previous shot. As Tina approached the camera, the tiled wall—a contentious feature of Braunstone Health Centre— filled the frame. [fade out to black] (screen capture)



Fig. 94. *Virtual Braunstone*. Opening Sequence, image 5. [fade in from black] This static camera showed the entrance lobby and the view into the reception area. Tina, now without the pram but with a baby in her hands, passed through the frame. [cut] (screen capture)



Fig. 95. *Virtual Braunstone.Virtual Braunstone*. Opening Sequence, image 6. [fade in from black] The reverse shot of Tina coming into the reception area. [cut] (screen capture)

We applied lessons learned in earlier case-studies to the professionally-utilised virtual environments: *Virtual West Cambridge* and *Virtual Braunstone*. For example, *Virtual Braunstone* provides an example with deliberate integration of polyphonic presentation motivated by the narrative logic and the multiple viewpoints of the stakeholders including architects, virtual-environment designers, engineers, various groups of local residents, medical professionals, developers, the National Health Service consultants and other participants.

In one innovative design solution intended to support polyphony, *Virtual Braunstone* implemented a sophisticated framework affording multiple, alternative journeys representing various experiences and viewpoints. We organised the primary mode of access through the concept of task missions repurposed from computer games. By engaging experients in missions, we encouraged them to follow predetermined narrative-paths. These missions challenged experients to explore the environment through active engagement that required navigation (from fig. 109, p. 236 to fig. 113, p. 238), participation in conversations (e.g., fig. 102, p. 234 and fig. 103, p. 234), study and selection of narrative themes (fig. 104, p. 234; fig. 105, p. 235; and fig. 106, p. 235) and other dramatically engaging and educational tasks.



Fig. 96. *Virtual Braunstone*. Opening Sequence, image 7. [fade in from black] A brief close-up focusing on Tina [cut] (screen capture)



Fig. 97. *Virtual Braunstone*. Opening Sequence, image 8. The end frame of the wide panning shot that began on the right side of the reception area and panned to the right finally centring on the Receptionist. The ambient sound began to play at this moment. This establishing shot suggested Tina's point of view. It gave a broad description of the reception area and pointed to the next port of call, the Receptionist. The Receptionist was important as the source of information and advice. We indicated his significance by rendering him in perspective and colour. [cut] (screen capture)



Fig. 98. *Virtual Braunstone*. Opening Sequence, image 9. The camera returned to Tina shown in close-up patting the baby. [cut] (screen capture)

Each mission had a distinct topic, related to a particular location and plotted a unique path leading to it from the reception area. The prototype version included seven missions: Design Challenges, Courtyards and Natural Ventilation, Environmental Features, A Community Facility, Project Realisation and Management and Neighbourhood. We selected these themes to indicate the multiplicity of concerns significant for the Braunstone Health and Community Centre. Each mission mobilised a distinct cast consisting of 1) human speakers variously involved with the project (fig. 114, p. 239 and fig. 115, p. 239); 2) photographic evidence collected on site during construction (fig. 115, p. 239 and fig. 116, p. 239); 3) visualisations and simulations of technical issues, natural processes and construction procedures; 4) navigable (e.g., from fig. 109, p. 236 to fig. 116, p. 239) three-dimensional geometry; and 5) pre-rendered, animated two- and three-dimensional geometry.

We attempted to sustain a multiplicity of voices that was additive and contradictive. This multivalent representation reflected the complex and controversial character of the development. Multiple co-existing representations established a forum involving parties that the existing social-order typically kept apart such as design consultants and medical professionals or architects and local unemployed.

In our prototype, the designers of the virtual environment were also responsible for the construction of these missions. In further work and practical implementation, it will also be possible to allow other participants to construct and campaign for alternative missions promoting contrasting stories about places and design efforts in questions.

We supported the mission-based access with a free-exploration mode of representation more common in virtual environments. However, in *Virtual Braunstone*, missions and targeted first- and third-person camerawork conditioned and motivated free exploration interpreting and guiding interactive sequences. Both mission-based and free-exploration modes in *Virtual Braunstone* utilised cinematic camerawork, multiple forms of projection from orthogonal to perspectival and axonometric as well as a variety of rendering styles. These



Fig. 99. *Virtual Braunstone*. Opening Sequence, image 10. A wide shot of the reception area with Tina in the centre. At this moment, the system played the ambient sound characteristic of public interiors. The menu appeared on the right of the screen. From now on, the experient was in control. (screen capture)



Fig. 100. *Virtual Braunstone*. Opening Sequence, image 11 (optional event). If the experient deviated from the intended path, Tina stopped and a message appeared: "To begin, please come to the Reception Desk first". The system displayed similar messages whenever Tina collided with the invisible boundary of a mission. The messages addressed the experients directly reminding them of the active-mission targets. (screen capture)



Fig. 101. *Virtual Braunstone*. Opening Sequence, image 12. As the experient was navigating Tina towards the Receptionist, the camera switched to a reverse shot showing the approaching Tina and the reception area from his perspective. (screen capture)

montage-like capacities of interactive media reached beyond the capabilities of montage in cinema by associating particular representational choices not only with narrative logic but also with particular geometric-locations. With active engagement necessary for attainment of these locations, experients could compare the narratives offered by the designers with their own situated, enacted experiences.

Virtual Braunstone also utilised cartoon-style rendering in the context of an architectural presentation.[1] I suggest that non-photorealistic visual styles provide flexible setting for the support of polyphony. In *Virtual Braunstone*, utilisation of non-photorealism allowed us to accommodate multiple types of interactive, dynamic and static content including photographic images, recorded movies and computer animations.

The National Health Service planned to complete the physical building before the completion of *Virtual Braunstone*. Therefore, some of the potential users could visit the physical building to gain a visual impression. Where this was not possible, we could make available photographs and videos collected on site. The virtual environment did not have to compete with the high-fidelity of the physical construction. Instead, we could support and diversify the simplicity of cartoon-style presentation with a broad variety of photographic and simulated imagery taken during different stages of construction, during different events or in different lighting conditions (fig. 115, p. 239 and fig. 116, p. 239). Cartoon-style representation of the architectural and natural elements also allowed flexible and economical inclusion of other non-photorealistic representations. For example, *Virtual Braunstone* included outline representations of people, cars and trees (fig. 90, p. 230; fig. 91, p. 230; and fig. 92, p. 230); shaded representations of main characters (fig. 93, p. 231 and fig. 97, previous page); and diagrammatic pre-rendered animation.

Incorporating photorealistic detail into navigable real-time virtual environments is difficult for several reasons. There are technical difficulties in achieving simulated, digital realism. This is possible in

1. Real-time non-photorealistic rendering continues to be a non-trivial technical challenge, especially in architectural representations. I plan to present the details of our technical solutions in future academic papers because while innovative, they do not directly pertain to the focus of this thesis.



Fig. 102. *Virtual Braunstone*. Opening Sequence, image 13. As the experient navigated Tina closer to the receptionist, the camera switched to a behind-the-shoulder shot showing Tina and the Receptionist. The Receptionist came closer to the counter and the two characters began a conversation. We pre-scripted this dialogue in order to demonstrate the advice-giving role of the receptionist. Other dialogues between Tina and the Receptionist depended on experients' choices. This image also shows the interface controls on the right of the screen. (screen capture)



Fig. 103. *Virtual Braunstone*. Opening Sequence, image 14. Tina requested help from the Receptionist by saying, "Yes, please. I've not been here before." In response, the Receptionist introduced forthcoming options by asking "Where would you like to go?" After the dialogue was complete, the camera flew up through the roof. (screen capture)

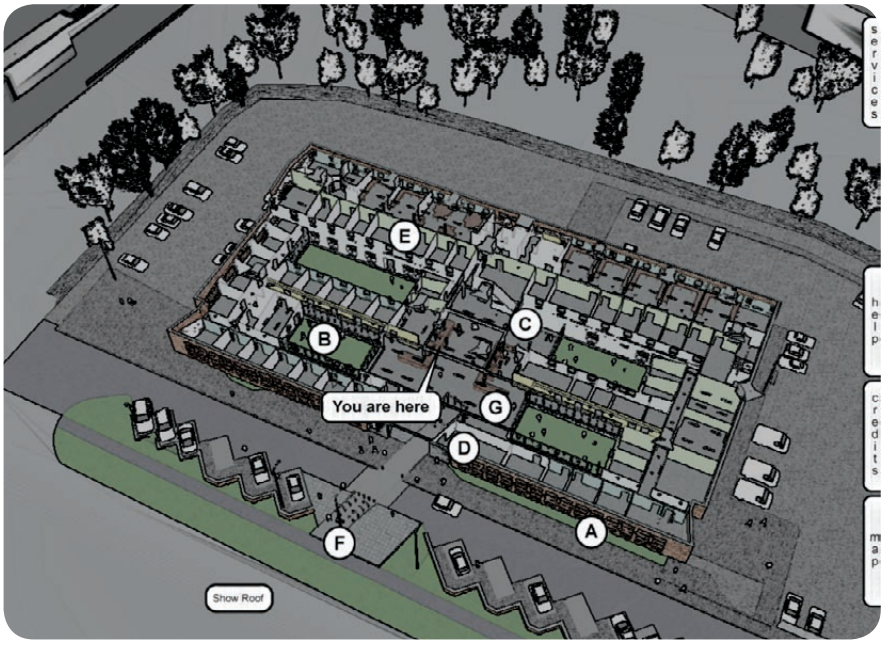


Fig. 104. *Virtual Braunstone*. Aerial View. The camera came to rest showing the aerial view of the site. The roof of the building was invisible. The letter markings appeared and a "You are here" sign flashed three times. This view completed the opening sequence and functioned as the hub from which experients could undertake multiple missions. With the Show Roof button "on", the system also could show the roof of the building. (screen capture)

high-budget moving-image productions but not in real-time applications. Photorealism is expensive and time consuming. It requires specialist programming and powerful hardware. In design contexts, it is also suspect as a fake and, possibly, manipulative portrayal. By contrast, photography is an established technique of documentation with well-understood advantages and drawbacks. It is cheap, easy to produce and aesthetically rewarding. The same, to a lesser degree, is true about video. While production of real-time environments re-

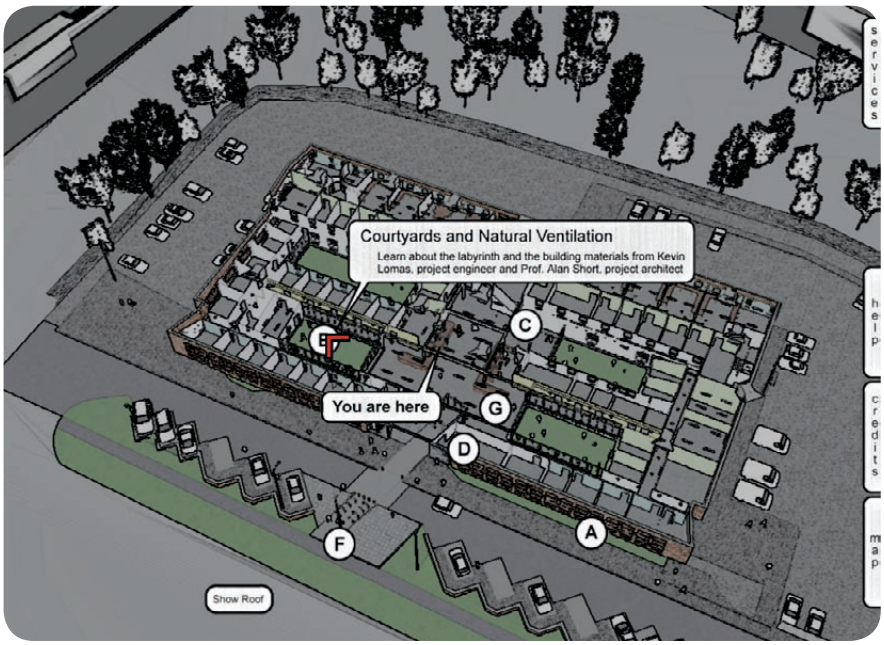


Fig. 105. *Virtual Braunstone.* Interface Elements. Pressing the Space key displayed the cursor. Rolling the cursor over the letter markings brought up the titles of the missions. Interface buttons on the right brought up further interface-elements. In this case, the selected sequence is Courtyards and Natural Ventilation. (screen capture)

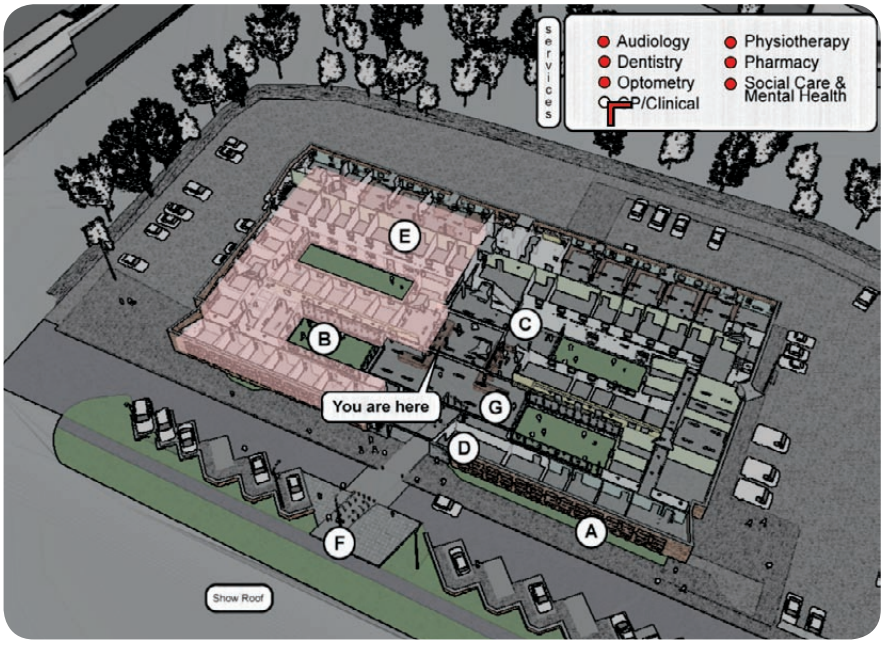


Fig. 106. *Virtual Braunstone.* Interface Elements (optional). Pressing the "Services" button displayed a list of services. Rolling over the entries in the list highlighted corresponding areas in three-dimensional views. The system could also display these highlights during first- and third- person navigation. In this way, experients could practice the map-knowledge gained in the aerial in the interiors of the virtual building. (screen capture)



Fig. 107. *VirtualBraunstone.*Courtyard sequence, image 1. This sequence illustrates one the seven missions—Courtyards and Natural Ventilation. A click on the "B" button displaying the Courtyards and Natural Ventilation tag begins the mission. (screen capture)

quires highly trained and experienced specialists, many people are now familiar with the production of visual and audio content in the form of sketches, photographs and movies. Expressive capacities of these non-specialists in comparison to professionals can be constrained by multiple factors such as the lack of sustained learning and practice, or limitations on material resources. It is also important to note that while production of non-interactive audio-visual content is simpler, it still can require a lot of time, money and knowledge. Yet,

as open-source, participatory-journalism, do-it-yourself and hacking phenomena demonstrate, broad social participation can produce sophisticated and unexpected results able to complement or subvert the efforts of the experts. I argue that outside of commercial environments exemplified by game development, where high-number sales can justify the expenses of development, mixed-media and non-photorealistic virtual environments have better potential at coping with polyphonic requirements of representing performative places than navigable environments aspiring to photorealism and immersion.

Finally, similarly to *Shenmue II*, *Virtual Braunstone* gave access to its environment through an idiosyncratic character. This character existed in the virtual environment as a navigable avatar. By engaging with the avatar, experients could access the worldview of another fictional but realistic person. The *Virtual Braunstone* prototype implemented only one such character, Tina, a young mother with a baby (fig. 93, p. 231 and fig. 95, p. 231). With permission, we borrowed the idea for this character from a documentary film about the estate (Woolcock, Penny. UK 1999). Following the filmmakers, we chose this character as a typical visitor whose needs challenged the architects with special requirements for privacy and resulting complexities in navigational and visual access to locations. Tina also provided a telling contrast to typical consultants involved with the development of National Health Service buildings. The implementation of the avatar as a protagonist in *Virtual Braunstone* suggested promising routes for further research that can explore the effects of character-utilisation in the consultation process.

In order to illustrate the character of the integrated multi-modal approach to representation in *Virtual Braunstone*, I include two visual sequences showing the progress of an experient through the environment.

The first example is the introductory sequence that greeted every experient of *Virtual Braunstone* (from fig. 90, p. 230 to fig. 109, this page). It introduced the non-photorealistic visual style openly announcing the artifice of the virtual-environment representation and, through a pre-scripted sequence, established the cinematic conven-



Fig. 108. *Virtual Braunstone*. Courtyard sequence, image 2. When the experient selected a mission in the aerial view, the camera flew back into the building and the conversation between the receptionist and Tina resumed. The receptionist explained the route to the destination of a mission and reacted appropriately when the experient returned after successfully completing a mission or abandoning it. Tina and the receptionist were able to engage in simple dialogues about the missions using stock phrases. Tina inquires about the selected mission. (screen capture)

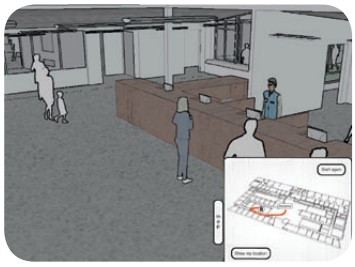


Fig. 109. *Virtual Braunstone*. Courtyard sequence, image 3. The camera cuts further back and Tina takes two steps back. At the right of the screen, a map appears showing the route from the reception to location "B". The recipient is in control. We designed a map for each mission. The system showed it after the experient selected a mission and hid it after several seconds. Using interface controls, experients could make it appear again. We chose to show the map in a simplified way and hide it to encourage the experients to explore the environment. After the dialogue with the receptionist, it was up to the recipient to find the way to the destination. (screen capture)

tions subsequently used in support of interactive missions. These conventions permitted cross-fades and cuts to suggest instant relocations or time jumps and employed reverse shots to portray dialogs and relate characters' actions to the surroundings. These techniques are familiar to everyone who watches films but are less common or expected in virtual environments. The opening sequence also introduced Tina as the protagonist and a navigable avatar. Close-ups invited the experient to turn attention from the environment to the character and reflect on the feelings she could have while entering this new building. The opening sequence also introduced the building by drawing attention to the architectural detail important to the project and established cartoon-rendering as the basic visual style.



Fig. 110. *Virtual Braunstone*. Courtyard sequence, image 4. Following the instructions of the receptionist, the experient steers Tina towards the courtyard. The camera pans to follow her movement. The receptionist also turns to follow Tina. (screen capture)



Fig. 111. *Virtual Braunstone*. Courtyard sequence, image 5. As Tina passed the corner of the counter, the camera switched to a static shot showing the courtyard in the background and the door, that the receptionist described earlier, to the left. The experient navigated towards the door. This shot had a wide field of view, different from the shot before. (screen capture)

The system could surround a portion of the environment with an invisible boundary (fig. 100, p. 233). The configuration of the boundary depended on the story line chosen by the experient. The boundary prevented the experient from wandering off the intended path and getting lost in an unfamiliar building. We used multiple invisible boundaries representing different scenarios in different locations and highlighting multiple meanings of the place.

The second example is one of mission sequences taking the experient from the moment of mission selection to a meaningful destination serving as the mission's goal (from fig. 113, next page to fig. 117, p. 240). The sequence demonstrates that cinematic rhythm helped to describe the character of architecture and could portray the movement of the avatar from location to location. Utilization of multiple cameras provided a variety of views into the environment. This variety, orchestrated into cinematic sequences, contributed to a more flexible and comprehensive representation of the place and its performative characteristics. Typical first-person cameras have fixed fields-of-view and follow floors at fixed heights. The cinematic approach can take cameras to locations typical to building visitors (e.g., fig. 117, p. 240) but also to locations inaccessible to, unappreciated by or unknown to them (e.g., fig. 109, previous page and fig. 110, this page).

A cinematographic approach allowed us to highlight unobvious characteristics of the project, for example, visual permeability (fig. 112,

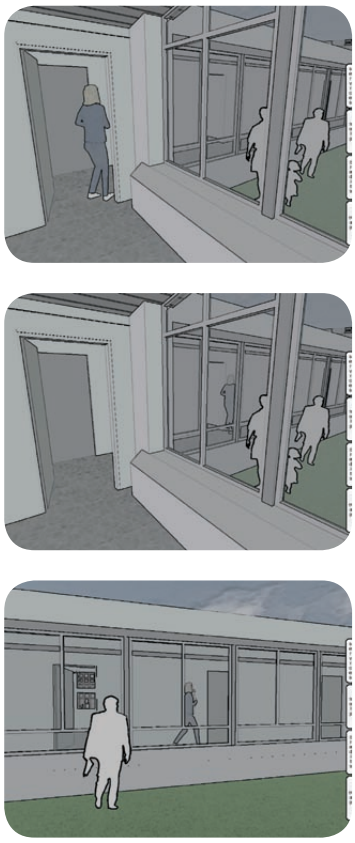


Fig. 112. *Virtual Braunstone*. Courtyard sequence, images 6, 7, 8. When Tina approached the door, the camera switched again. The experient steered Tina through the door and followed the corridor. The camera remained static. In the next shot, the camera was in the courtyard. It panned left-to-right as the experient steered Tina towards the end of the corridor. (screen capture)

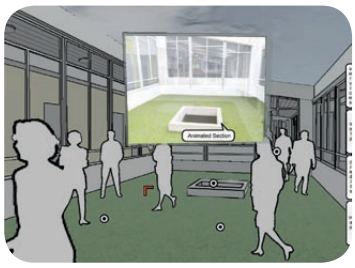


Fig. 113. *Virtual Braunstone*. Courtyard sequence, image 9. Tina was in the courtyard. The camera smoothly transited from the third- to the first-person point of view. The experient saw a video screen located in the courtyard. The initial screen read: "Click on the screen to start the video". The experient followed the invitation and the movie began to play. (screen capture)

this page), which was one of the important innovations of the project's architecture. Transparency in the building let in air and light, helped security and encouraged the emergence of community involving visitors and employees. Simultaneously, discrete access to the building and locations within it was also paramount. In response, the building provided an alternative system of enclosed corridors that lead to the rooms that needed a possibility of private access. We demonstrated the types of access through the corridors in another mission.

We were also able to relate destinations as shown in the sequence from fig. 108, p. 236, to fig. 113, this page. The shots in fig. 112, this page, made the link with the courtyard suggesting it as the target for the journey. The experients could see characteristic protective-tiles covering the front façade through an open door helping the experients to relate their current position to the already-familiar part of the environment. The figures in the courtyard indicated its accessibility.

Each mission lead to a destination that hosted context-specific multimedia content. The Courtyard sequence gave access to a series of movies discussing architectural, environmental and technical parameters of the design. For example, these movies presented the passive ventilation system that featured a labyrinth with air intakes in the courtyard. The architect and the head engineer explained the role of the courtyards and the labyrinth in a deep-plan building. They spoke in front of the construction site or in the digitally-created animated-environments explaining the geometry of the building or showing diagrammatic presentations of the processes. The videos employed such visual devices as collage, montage, animated section, particle and lighting simulations. Following the narrative, the movies transported the speakers from one location in the building to another. In this way, we could associate diagrammatic data such as temperature and airflow levels with relevant locations. The use of cinematic devices also made it possible to follow the path of the air from the courtyard, through the ventilation labyrinth and into the reception lobby.

The photographs were shot on site and showed the details of the building, such as the ventilation system (fig. 115, next page), in varying degrees of completeness. The combination of diverse media types

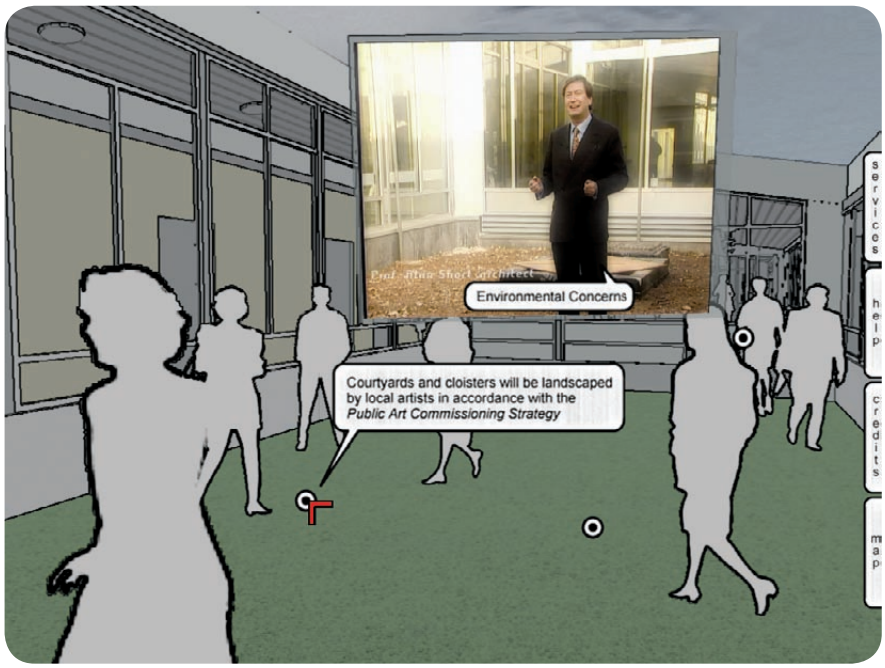


Fig. 114. *Virtual Braunstone.* Courtyard sequence, image 10. The movie was annotated by a textual tag. In it, the project architect discussed the environmental features of the design. The experient was free to move about the courtyard and explore the buttons visible in the frame. Rolling over buttons brought up associated textual or visual tags with information about the surrounding. (screen capture)

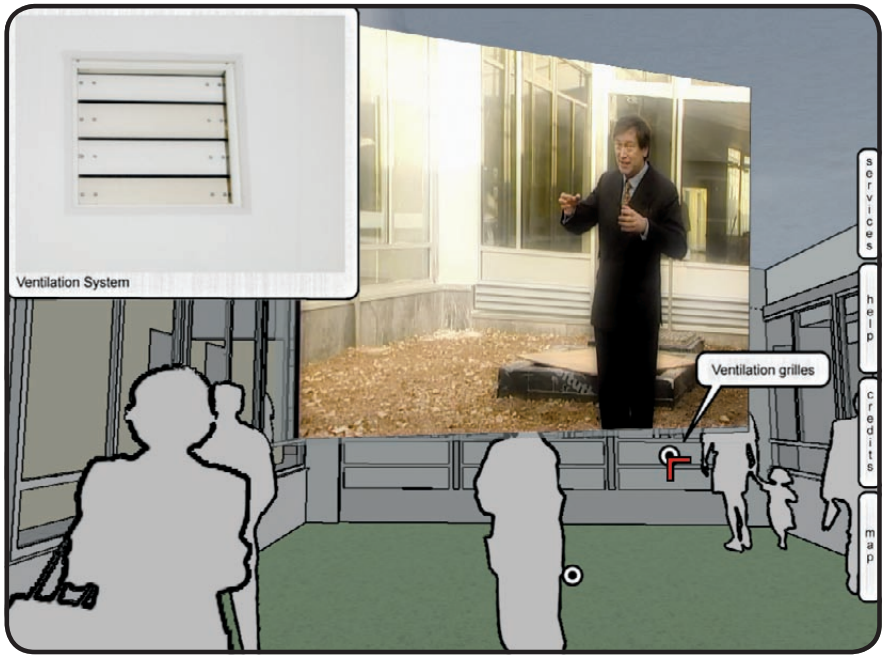


Fig. 115. *Virtual Braunstone.* Courtyard sequence, image 11. A click on the button displayed a series of photographs describing the ventilation appliances installed around the courtyard. (screen capture)



Fig. 116. *Virtual Braunstone.* Courtyard sequence, image 12. A button triggered another sequence of images showing the detailing and appearance of the corridors. (screen capture)

provided a discussion of the issue in the movie, encouraged the experient to locate the architectural elements in the three-dimensional geometry of the courtyard and described these elements in photographic quality and in the varying process of construction.

The requirement to retrace the mission's steps helped experients to consolidate their knowing and see the environment in a new light. When experients returned to the reception, the receptionist enquired about the success of their mission. If the experient reported success,

the receptionist offered the chance to engage in another mission. Otherwise, the receptionist offered additional instructions. The experients were free to decline the offer and could then explore the virtual environment freely in the first-person-camera mode.



Fig. 117. *Virtual Braunstone*. **Courtyard sequence, image 13. Having reached the mission's destination, the experient returned to the Receptionist and had an option to answer positively or negatively to his questions: "Was the courtyard open? Have you managed to find it?" (screen capture)**

I argue that virtual environments lack a natural point of view because all eyes, human, animal or prosthetic construct peculiar and partial ways of vision. This attitude is contrary to common practices that use first-person, third-person or axonometric cameras and rarely utilise them to articulate relationships between views, geography and events. Most often, designers strive to show the virtual world as if seen through the eyes of an avatar or a freely roaming camera. Many researchers and designers presume that this approach is natural and necessary for immersion (e.g., see Laurel, 1986, 1991). This goal makes sense for technical applications such as flight-simulators but does not support the multiplicity and diversity of possible involvements with places. The realisation of the necessarily-subjective character of encounters with places in general, and with virtual environments in particular, opens new directions for development of representations in support of place-making and habitation.

In this section, I have demonstrated how computer-supported representation is capable of making evident and fostering polyphony of worldviews and interpretations characteristic to all places. I suggest that acknowledging and developing these representational capabilities as an integral part of design computing is beneficial to the creative process.

This consideration of polyphony concludes my overview of the characteristics of design computing compatible with and supportive of creative place-making. While this overview could not be exhaustive, it provides a range of observations and practical examples that refute limited and negative interpretations of design computing in the architectural creative process.

IV.3 DESIGN COMPUTING IN SUPPORT OF CREATIVE PLACE-MAKING

Commonly, discourse and practice assume that creative design-process implies singular, well-defined, in-control authorship, requires epiphany of unknowable origin, presumes prescriptive and tightly focused goal-orientation, engages with artefactual outcomes, accepts narrow professional specialisations, operates with absolute categories such as efficiency, harmony or beauty and exists to solve problems.

Contrary to these assumptions, I have referred to emerging alternative-approaches in design and used the experience of my case-studies to show that creative-design process is situated, relative and negotiatory. As such, it deals with wicked rather than solvable problems, can be different for different participants and able to produce multiple, contradictory, simultaneous outputs. Contemporary design-practices grow increasingly transdisciplinary and reliant on multiple types of knowledges. Rather than focusing on tightly specified problems these approaches look for opportunities, prepare favourable conditions by building communities and stage provocations with critical purposes.

This chapter has demonstrated that creative-design processes are more flexible than common opinions suggest. I suggest that architects can consciously study and cultivate this flexibility in pursuit of more inclusive, open and rewarding design-practices. With this potential for openness, collaboration and multiplicity, the architectural creative-process emerges as potentially adequate for the difficult tasks of place-making.

Another common assumption in architectural discourse and practice is that design computing cannot contribute to creative-design process because it cannot support spontaneity, multiplicity, fuzziness, tacit qualities and cultural awareness of architectural in-practice thinking.

Contrary to these assumptions, my case-studies have shown that design computing in creative-design process is able to support open, polyphonic, idea- and insight-generating participatory exchanges. Through the examples drawn from my case-studies, I have demonstrated how design computing can support such vital creative-practic-

es as open-ended collaborative exploration, rehearsing, manipulation of complexity, flexible feedback and evaluation, translation, performative thinking, proactive campaigning and polyphony.

Consequently, I suggest that design computing is able to support distributed creativity in place-making and in some cases is indispensable for its sustenance and success.

V

CONCLUSIONS: RESEARCH METHODS IN ARCHITECTURE, PERFORMATIVE PLACE AND CREATIVE POSSIBILITIES

V.1 PARTICIPANT OBSERVATION AND INVESTIGATIVE DESIGNING

In response to the needs for persuasive architectural-theories and better transfer of research into practice this thesis has asked whether a hybrid approach that combines participant observation and investigative designing can be conceptually coherent and practically useful in the study of creative design-processes in place-making. By 1) developing and openly presenting primary knowledge-claims; 2) establishing participant observation and investigating designing as an integrated method of research; and 3) presenting the benefits of using practical and closely-researched rather than imaginary and loosely-referenced case-studies, the methodological section of this thesis provides the foundation for my consideration of places and place-making. Together with the rest of this thesis, the chapter on methodology offers insights on how participant observation and investigative designing can contribute to the study of place-making thus confirming the utility of these methods in architecture.

In this thesis, my efforts towards a conceptually coherent methodology resulted in the development of a framework consisting of openly-presented knowledge claims, methods of research and criteria for rigour. While this framework is only one of many possible approaches to knowledge construction, I suggest that its introduction into the architectural discourse contributes to the theoretical vocabulary of the field by 1) setting a proactive precedent for openness and clarity

in an area where ontological and epistemological positions are often obscure; 2) further legitimising participatory and designerly understandings of knowing; and 3) theoretically justifying participatory and goal-oriented approaches to research. Coupled with the ensuing examples and discussion, this framework serves not only as a theoretical argument but also as an example of its practical application to case-studies.

The discussion of ontology and epistemology clarified that investigative designing and participant observation could both be suitable to the study of places and in this thesis, I have made an effort at integrating these two approaches. Such integration is unusual but gives important advantages.

Firstly, participant observation and investigative designing, employed together, help to expose designers' visions, motivations, methods and moves by affording researchers with insiders' insights into the situations under study. These insights would be difficult or impossible to obtain through other methods. In place-making, a valuable insight is that of a designer. While designers routinely engage in experimentation in preparing their ideas, they are often not conscious of reflection in and on action. The instances where they record and critically appraise their reflections or share them with others are even more rare. In creative production and professional practice outside of research contexts, designers rarely have the need for systematic self-analysis of their practice. In an effort to expose some instances of designers' knowing in relationship to place-making, I developed working prototypes making an effort to observe the emergence and life of places influenced by my design moves, reflecting on the meaning of the participants' actions, preserving traces of designing and noting patterns of habitation. Design and construction of working prototypes exposed my theoretical propositions to a wide variety of participants acting in complex, practical circumstances. Analysis of these rich, polysemic and dynamic situations challenged my theoretical understanding simultaneously encouraging and enabling me to refine and advance my arguments.

Secondly, in a reverse move, integration of participant observa-

tion and investigative designing helps to direct and provoke social research with goal-oriented action targeted at specific areas of concern. Observational case-studies as practised by constructivists or grounded theory proponents lack goal orientation and as such have limited capacity for in-the-field experimentation with possible scenarios. By contrast, I integrated observation with designing that had goals acknowledged as useful by immediate stakeholders and established as significant during my review of design context and literature. Integration of participant observation and investigative designing directed my observational work towards existent practitioners' concerns and enabled me to focus my theory-making around these issues of interest. Distributed creativity, design computing and place-making—my primary issues of concern—do not often appear as closely interlinked concepts within the architectural discourse. Consequently, it is difficult to study their integration using existing examples. Instead, my approach allowed experimentation with innovative computational techniques to develop simultaneously with the study of their impact on place-making and creativity.

Ethnographic-style, lived knowing provoked by investigative designing and obtained through participant observation manifests itself as both internal and external effects such as memories of experiences and interpersonal encounters, design expertise, management skills, and emotions as well as in-field notes, sketches, models, photographs and videos. Analysis of these effects supports inductive theory-making that remains in touch with rich emotional experiences of places. In my case-studies, multi-modal collection of material and mixing of analysis with action proved particularly useful in disentangling complex relationships and contradictory interpretations of places.

Future work on participatory research-methodologies

The performative-place approach advocated in this thesis invites further developments in design-research methodologies. These development can address: 1) greater involvement of atypical actants and more consistent public-exposure of the projects beginning from the early stages of the design process; 2) greater efforts at participatory designing and development of integrated techniques for capturing

and representing communications between stakeholders; 3) further evolutions of representational apparatus with a focus on greater integration of the visual, tactile, experiential and performative into research-style communications; 4) further progress in dissemination of research outcomes and utilisation of potential benefits.

V.2 PERFORMATIVE-PLACE APPROACH

In preparation of this thesis, I considered theoretical work on space, place and performance stemming from many fields of research that included anthropology, ethnography, geography, philosophy, psychology, cognitive studies, cultural studies, media studies, computer science and others. Until recently, the discussion on the nature of place emerging in these fields has had limited impact in architecture. The understanding of place presented in this thesis is a synthesis of this work considered in application to the architectural problematique. In developing its conceptual approach and considering its application in architecture, this thesis contributes a novel theoretical attitude to the ongoing discourse on the construction of habitable environments.

The thesis presents this re-conceptualized approach to places, predicated by the need for a conceptual framework adequate to contemporary challenges, as an integrated, performative-place approach demonstrating that it is possible to theorize places as multiplicious, continuously re-enacted social constructions with relational nature and fluid boundaries. This understanding helps to recognise a broader range of situations as places that offer new challenges and opportunities for architectural creativity. In addition to challenging architectural designing with these new areas of concern, the performative-place approach also points to new creative resources accessible through collaborative creativity.

V.2.1 Critique and expansion of the existing discourse on place

In developing the performative-place approach, this thesis has critically considered a number of notions traditionally associated with the concept of place. While useful within their discursive traditions,

these notions can be constraining to the development of a discourse on architectural designing of newly emerging, technology-saturated places. By questioning these notions and demonstrating a need for a discussion of theoretical fundamentals in the contemporary, quickly changing conditions, this thesis usefully contributes to architectural discourse. This theoretical discussion involves transdisciplinary knowledge-transfers because relevant reconsiderations have already produced convincing theoretical-alternatives in other fields. In this thesis, I supported these knowledge transfers with the examples drawn from my case-studies in order to consider and emphasise the relevance of imported or newly developed theoretical postulates in relationship to architectural designing.

In my critique of the traditional, influential understandings of place, I suggest that places do not constitute well-defined bounded regions but, instead act as sites of transactions. I also refute the notion that places depend on, are located in or are contained by ubiquitous and uniform Euclidean space. Humans can disagree on locations and boundaries of places. Specific places can assemble from multiple, often temporary locations and their distributed nature does not prevent their stability or their shared, widely accessible character. Another traditional notion that needs reconsideration is that of identity. I suggest that places do not equate to static, unifying identities and argue that, instead, they emerge through continuous conflicts. Similarly, it is often constraining to pair places with communities. Both places and communities can have widely distributed, extended natures. Often, places can support multiple coexisting communities that can co-operate, conflict or be unaware of each other's presence. Home is another notion that often has romantic overtones and appears in discourse as a metaphoric equivalent to place. However, the sentimental notion of home can have essentialist overtones that are excluding to groups of stakeholders and discriminatory to recent phenomena such as digital technology. I argue that places are not neutral and that they do not carry automatic positive or negative value. Instead, their composition and meaning have to be the subject of critical appraisal conducted in a participatory, immersive, situated fashion.

Dissociation of the notion of place from the constraining interpretations discussed in this thesis allows me and others to recognise as places various phenomena that are currently excluded from or underrepresented in the architectural discourse and practice. I argue that this broadening of the architectural profession's remit is essential in the contemporary situation where the established boundaries and engagements of the architectural field dissolve under the pressures of new economic and social practices. Not only does the critical reconsideration of the discourse on place bring in new types of places but it also updates the criteria for coherence, self-reflection and rigour in line with the wider debate in social, cultural and political studies.

V.2.2 Towards a performative understanding of places

Relational places

This thesis interprets places as social constructions that involve multiple heterogeneous actants including objects, people, nature and technology. Using case-studies and the existing recent literature it develops an understanding of places as rhizomes of continuously reenacted relationships between human and non-human participants treated as epistemologically identical entities. This view contributes to the construction of an inclusive and adaptable foundation for research in support of architectural designing. A theoretical foundation giving presence and voice to diverse ecological, technological and cultural entities can help architects to reappraise their in-practice reasoning and thus encourage innovative outcomes.

The relational understanding of places as social constructions emphasises that all places are technological and invites analysis of newly emergent environments such as virtual worlds, augmented environments and networked environments as places. As places, technological environments appear embedded in the experiential world. This embeddedness suggests design approaches attentive to subjective interpretations and able to complement and guide technical development. For example, the experience of *Virtual West Cambridge* (e.g., see p. 117 et seq.) demonstrates multiple practical benefits from a re-

lational and situated interpretation of a virtual environment.

The relational understanding of places suggest that the focus of architectural designing must be on the staging of relationships rather than on the manufacturing of artefacts or the erection of buildings.

Multiplicious places

This thesis suggests that places are assemblies of multiple forms performed by multiple heterogeneous actants and polysemic for each actant or group of actants. Consisting of multiple, simultaneous identities, places lack unified meanings or indisputable interpretations.

Among my case-studies, examples of multiplicious places included *Virtual West Cambridge* (e.g., see p. 128) and *The Parasite* (e.g., see p. 129 et seq.). I suggest that the recognition of the subjectivity and multiplicity of simultaneous interpretations, among which the interpretations of the designers do not have automatically privileged roles, can help to improve design outcomes by educating architects about alternative values, usages, behaviours and visions.

The performative-place approach helps to recognise multiple actants that practitioners and academics often do not know or ignore. Even most controlled places house hidden, alternative or subversive performances. The commercial mainstream increasingly recognizes the monetary value of this multiplicity. Tours of the underground facilities in Disneyland or the "making of" documentaries distributed with feature films on DVDs are example of such recognition that developed in spite of the controlling, illusion-oriented intentions of these enterprises (cf. Smith, 2002 on illusions in Wagnerian opera and Disneyland).

The performative-place approach contributes to the acceptance of atypical actants as legitimate or even inspiring entities in architectural and professional discourse "at once extending the range of entities at work in the world and actively participating in transforming some of them into faithful and stable intermediaries" (Latour, 2005). Construction of intermediaries, or punctualised actants with commonly recognised attributes and functions, helps architecture to adapt to its new challenges by providing useful concepts and vocabulary for the inclusive discourse on, initiation and maintenance of collaborative

place-making.

The view of places as multiplicious performances enacted by heterogeneous casts frees architectural design from monistic or arbitrary worldviews. Rather than urging participants to agree with a pre-written script, the performative-place approach contributes to the empowerment of participants by accepting a variety of practices and promoting flexible, voluntary and multidirectional collaborative learning.

I argue that in places, appreciation of multiplicity is a useful design-resource. The performative-place approach exposes the significance of polysemy, polyphony and polypraxis in places. This updated understanding provides a vocabulary and a conceptual framework that can inform further practical experimentation or empirical data-mining.

Fluid places

The performative-place approach describes places as fluid or process-based, always-changing, polychronic and fuzzily bounded. This stance contributes a useful theoretical perspective to architectural thinking because it challenges architects not to strive towards the condition of closure impossible in continuously fluid, multiplicious, conflictful places. By shifting the focus to the continuity of performance, the performative-place approach suggests new directions for practice and research stressing that architecture needs to develop strategies suitable to working with dynamic situations. The interpretation of places as extended engagements introduces new useful criteria for evaluating and guiding architectural designing because it foregrounds unobvious involvements and consequences. For example, the understanding of places as fuzzily bounded processes led to a reconsideration of the meaningful contribution of an architectural installation during *The Parasite* project (e.g., see p. 138 et seq.).

Negotiated places

The performative-place approach describes places as negotiated—sustained by multidirectional and potentially conflicting engagements such as those of communication, representation and translation. Ar-

chitects produce inscriptions specifying participants and setting relationships, yet if some of the actants do not act as prescribed, the performance cannot happen as planned. Therefore, architects have to campaign for support from multiple human and non-human allies. For example, *The Parasite* project demonstrated how place-making progresses through continuous negotiations (e.g., see p. 142 et seq.). The case-studies also demonstrated how the efforts of campaigning and collaboration with heterogeneous actants require multi-modal translation between different worldviews, ways of expression and practices. For example, this was particularly evident in the public consultations staged during the *Virtual West Cambridge* (e.g., see p. 117 et seq.) and *Virtual Braunstone* projects. The need to participate in translation, casts architects, together with the other actants, in a variety of simultaneous or subsequent roles that can support or contradict each other (e.g, as in *The Parasite* project, p. 144 et seq.). This view of participants as complex, contingent entities advances the understanding of place-making communications beyond the simplistic and still-common dualisms of architect—client or architect—user pairs.

The recognition of the negotiated character of places also draws attention to the conditional character of design-task framing. When practitioners are not aware that they actively frame roles and problems, they see no need to attempt alternatives. Accepting reality as a given, they force customary and often inadequate methods on new problems.

> When a practitioner becomes aware of his frames, he also becomes aware of the possibility of alternative ways of framing the reality of his practice. He takes note of the values and norms to which he has given priority, and those he has given less importance, or left out of account altogether. Frame awareness tends to entrain awareness of dilemmas. (Schön, 1983, p. 308)

The performative-place approach can help architects to become more observant, critical, inclusive and responsive in socially and technologically challenging social situations characteristic of contemporary places.

Expressive places

The interpretation of places as hybrid, multiplicious, fluid and nego-

tiated provides the components for an understanding of places as expressive—capable of producing drama by framing actants, staging encounters and containing narratives. My case-studies demonstrate that places can express relationships, frame performances and provoke behaviours. For example, the installations of the *Klütterkammer* exhibition questioned the expectations and habitual behaviours of the visitors bringing them in emotionally potent, socially-challenging, dramatic situations (p. 147 et seq.). In another example, *Virtual Cuthbert Hall* and *A Warning for the Curious* both created tension and drama by associating provocative narrative-content and characteristic moods with particular areas of their environments.

The analysis of place-construction through individuals' actions demonstrates differences in personal interpretations. The resulting diversity of engagements with situations encourages participants into distinct dramatic and narrative roles. These contingent modes of participation again suggest kinaesthetic, analytical and emotional complexity that extends beyond the meanings encompassed by the concept of usage. Instead, I suggest that discourses of narrative and drama can better describe such encounters.

An understanding of places as expressive performances reveals that familiar actants often engage in unexpected roles. For example, human actants can perform as enclosures, form boundaries, indicate paths, allow vistas and shift the balance of light. Schechner (2003) described how in many traditional rituals and ceremonies people act as sculptural elements—their number, positions, movement, attention foci and levels of involvement (ignoring, passing by, watching, participating) all having an impact. Kaprow (1993) insisted that in a rarefied atmosphere of an art-gallery, shapes, colours, numbers, distributions and behaviours of the spectators affect the appearance of artworks. Architects usually prescribe such functions to walls, barriers or windows. In a reverse move, non-human entities such as places or objects fulfil dramatic roles usually expected of humans—they can be anxious, joyful, curious, mysterious or playful. Non-humans can motivate behaviour, encourage communication and necessitate learning. For example, the *Klütterkammer* boxes (e.g., p. 154 et seq.) highlighted

relationships between the media and the surrounding place emphasising the exhibition's places as stages for emotional, dramatic exchanges. Situated dramatic encounters are of interest to architectural designers because they can give new or redefine existing meanings of architectural structures thus creating new forms of places. As part of an architect's remit, they are as important as bricks and mortar or steel and glass.

V.2.3 Towards the performative as an area of concern for architectural designing

Tschumi (1996, p. 121) insists that "There is no architecture without action, no architecture without events, no architecture without program." He emphasises that this statement "runs against the mainstream of architectural thought by refusing to favor space at the expense of action." (ibid.) Since the publication of his book the mainstream thinking in architecture has not changed dramatically but the current, progressive discourse and designing do show a growing appreciation of architecture as a relational and transactional practice. In his recent article, Gage (2008, p. 14) claims that

> Once we consider architecture to be time based and enmeshed with the way that people perceive and use it, we find ourselves short of reliable conceptual tools that can be used to understand our craft. As an event or series of events in time, we can consider architecture as a performance containing both human and non-human changing protagonists.

By developing an understanding of places as performances, this thesis adds to the conceptual foundation of contemporary architectural-designing helping to highlight significant areas of concern that require further attention. The understanding of places as relational, fluid, multiplicious, negotiated and expressive social-constructions does not permit a theoretical possibility for a unilateral production of completed, static and universally understood places. Instead, it suggests that multi-modal communication and translation involving multiple, heterogeneous actants produce, or gather, places by creating and maintaining relationships. Consequently, architectural designing can benefit from emphasising activities directed towards encouraging, provoking and supporting these place-making relation-

ships. My term "relationship" in this context is necessarily a morph of many variants. I acknowledge that places involve many different types of relationships, that their number and complexity can be overwhelming and that many of these relationships cannot be directly controlled by architects or are valuable precisely because of their spontaneous nature. In human experience, all relationships are subjective constructs, partially individual and partially social. However, these culturally and socially constructed relationships interlink with other relationships—spatial, kinesthetic, tectonic, financial, biological, physical, chemical, electromagnetic—that persist without human interpretation. While architects cannot specify social constructs directly or have them manufactured, they can influence the processes between human and non-human stakeholders that underlie human perceptions. Whatever the actions of architects, they inescapably engage in cultural production because people appreciate and judge their work as social constructs. Whether unconscious or proactive, architects' interferences with meaning construction aiming to influence public perceptions, discourses and actions constitute a legitimate and important form of designing.

I cannot hope to cover or even outline all of the possible relationships that can combine to make places. Instead, in this thesis I explored and discussed some opportunities emerging on the tactical level of conceptual tools and techniques directly used in architectural designing. I have developed some such techniques during the case-studies discussed in this thesis and my chapter on staging places deals with some examples and implications. My observation is that the developments in the understanding of places paralleled by the flexibility offered by computer-driven designing and manufacturing have prepared the ground for a more process-oriented understanding of architecture. This understanding focuses on relationships or their representations in architects' models. My thesis contributes practical techniques and approaches as well as their theoretical groundings to the recent but increasingly influential discourse in architecture that explores the designing and making of complex geometries (e.g., see Aldersey-Williams, 2003; Bechthold, 2008; Bollinger, et al., 2008; Ki-

eran and Timberlake, 2004; Lynn, 1998; Pottmann, et al., eds, 2007; Rahim, 2006; Reiser and Umemoto, 2006; Rosa, 2004; Schmal, 2001; Terzidis, 2006; Verebes, 2006; Waters, 2003; Zellner, 1999), parametric approaches to designing (Aish, 2006; Frazer, 1995; Hensel, et al., eds, 2004; Shea et al., 2001; Woodbury, et al., 2006), techniques that support emergent or found design solutions (Frazer, 1995; Hensel, 2004b; Pasquarelli, ed., 2002; Shea, 2004; Sevaldson, 2000) or design-generating systems that relate situated social and environmental phenomena to the architectural form in its various structural, spatial, visual, interactive and other expressions (e.g., see Hensel and Menges, 2008 or Garcia, 2007).

The conceptual focus on architecture as the discipline that deals with dynamic relationships highlights that outcomes of architectural designing are processual as well as artefactual. The performative-place approach responds to the need for a theoretical outlook that can help to foster techniques for design solutions that do not converge to closure but, instead, stabilise as continually re-negotiated multi-party compromises. A view of places as continuously renegotiated emphasises an understanding of architectural designing as an activity embedded into and inseparable from places. As an activity integrated into places, architectural designing becomes valuable as a performance that is interesting and beneficial in its own right. Design performances help to uncover unobvious participations, recruit actants, align interests, surface passions, overcome restrictions and voice concerns. For example, the work of volunteers in the construction of *The Parasite* emerged as an engaging exercise in education that provided greater opportunities for learning than those afforded to conventional exhibition audiences. The scripted production during *The Parasite* project, the publicly-accessible displays of its visually-expressive outputs (e.g., see fig. 61, p. 207; fig. 65, p. 210; fig. 69, p. 214 and fig. 70, p. 215) as well as the choreography of the building-element assembly (e.g., see fig. 59, p. 195 or fig. 66, p. 212) emerged as performances that helped campaign for the continuation, completion and acceptance of the project. Public presentations and design meetings arranged during the *Virtual Braunstone* and *Virtual West Cambridge* projects as-

sisted active exchange and collaborative exploration.

Further development and utilisation of the performative-place approach

My future work on the performative-place approach will engage with a broader range of case-studies, including mobile, locative and multi-user online technologies. I also plan to return to ongoing projects such as *Virtual West Cambridge* and *Virtual Braunstone* guided by the lessons learned through the analysis developed for and presented in this thesis. Particular ideas might include greater integration of these virtual environments into the public discourse of the architectural developments they support and their usage for practice-based collaborative idea-development and learning.

V.3 STAGING PLACES

The discussion in this thesis confirms that creative-design processes are more flexible than common opinions suggest. Architects can consciously study and cultivate this flexibility in pursuit of more inclusive, open and rewarding design practices. With this potential for openness, collaboration and multiplicity, the architectural creative-process emerges as potentially adequate for staging places. By providing a theoretical perspective that argues with the discourse affected by a romantic understanding of creativity incompatible with contemporary place-making practices, the conception of creativity as a distributed, collaborative phenomenon usefully contributes to architectural-design knowing. This understanding encourages further study of distributed creativity in practice and enables recognition of performance- and communication-supporting characteristics of design computing. This recognition is a necessary foundation for further exploration and development of creative strategies that integrate contemporary technologies rather than resist them. Uneducated resistance not only prevents productive utilisation but also does not permit critical examination and exposure of technologies' social and environmental roles.

Through the examples drawn from the case-studies, this thesis has

also demonstrated how design computing can support such vital creative-practices as open-ended collaborative exploration, rehearsing, manipulation of complexity, flexible feedback and evaluation, translation, performative thinking, proactive campaigning and polyphony. On the strength of these demonstrations, I suggest that design computing is able to support distributed creativity in place-making and sometimes is indispensable for its sustenance and success. The development of in-practice examples and design-motivated inductive theories tackling social roles of design computing is necessary for its better integration into the broader performance of designing. By applying a novel theoretical interpretation to observational and in-practice examples, this thesis usefully contributes to design knowing by revealing unobvious links between situated habitation and computer-supported design strategies. Such linking exposes new meanings of the existing strategies and can help to integrate into design workflows newly emergent and speculative techniques.

The performative-place approach provides an updated theoretical interpretation to techniques of design computing such as parametric modelling, scripted automation or virtual environments casting them as actants supporting reflection, critique, communication and collaboration.

V.3.1 A compatible understanding of creativity

This thesis provides a critique of individualistic, romantic understandings of architectural creativity as incompatible with the challenges of contemporary place-making. In particular, it argues with the notion of singular, well-defined, in-control authorship emphasising that, instead, all architectural products emerge through complex collaborations. It also critiques the idea that creativity has subjective, mystical, divine or predominantly subconscious origins suggesting, instead, that creativity has distributed, situated and performative character. Similarly, I advocate an inclusive reading of the common definition of designing that describes it as a goal-oriented approach. This broader definition accepts that goal-orientation does not necessitate direct targeting of goals attainable within the confines of a project and ac-

knowledges the validity of alternative or tangential paths to preferred situations.

In contrast to exclusionary definitions of creativity, this thesis suggests an understanding of creativity as a collaborative, distributed and situated phenomenon. This understanding highlights practical, sharable, adaptable and learnable characteristics of creative-design processes based on the acceptance of creativity and designing as fundamental characteristics of many activities not restricted to geniuses or experts. This thesis demonstrates that creativity is reactive to the changing circumstances of situations and shows that a distributed, situated understanding of creativity can provide architects with new approaches to place-making based on the utilisation of multiple, complementary knowledges held by heterogeneous stakeholders. The distributed character of the creative-design process also highlights that the complexity of designing does not fit into the confines provided by rigid step-based, linear or iterative theoretical models. I see designing as a complex assembly of multiple continuously re-enacted relationships that can variously appear as analysis, concept-making, judgement, selection and action. These appearances can compete or occur simultaneously and are contingent on the circumstances of concrete participants. Designing involves multiple types of involvement, changes of direction, spontaneous or random moves and other, emergent, exploratory activities. All of my investigative-designing case-studies exhibited these qualities with *The Parasite* and *Virtual West Cambridge* providing the most characteristic examples of multi-directional, contradictory and negotiatory modes of development. For instance, the discussion of the negotiations during *The Parasite* project (p. 142 et seq.) illustrates this way of thinking about the design process.

The conception of creativity and designing that recognises their complex, contingent, and distributed character is compatible with the understanding of place offered by the performative-place approach. The utilisation of the performative-place approach, supported by the cultivation of distributed creativity, can benefit collaborative learning, community building, communication and the sharing of tacit know-

ing necessary in place-making.

V.3.2 Towards creative design-computing

This thesis disagrees that design computing hinders or misguides creativity in architectural design. Instead, I argue that design computing can greatly contribute to the development of workflows in support of spontaneity, multiplicity, fuzziness, tacit qualities and cultural awareness of architectural in-practice thinking. At the present time, when a limited number of software developers standardise the digital tools available for architectural designing, architects must offer creative resistance in pursuit of flexible, computer-enabled practices that allow free exploration and are inclusive of multiple types of actants. This thesis aims to alleviate the sceptics' concerns regarding design computing by suggesting a socially-conscious interpretation of design computing as an integral part of performative place-making. In pursuit of this goal, it discusses design computing as a social practice that contributes to multiplicious and open communication in architectural designing.

Open-ended collaborative exploration

Using the case-studies, this thesis argues that design computing can aid creativity by supporting randomness, ambiguity and indeterminacy emerging from performances of hybrid, socially-constructed assemblages. My experience highlights that architects can share simulative, exploratory situations with other actants, including computers. For example, the form-finding during *The Parasite* project occurred as negotiatory explorations in the design space where ambiguous, unexpected replicas of computational entities achieved multiple useful goals such as eroding designers' stereotypes or provoking reactions in human participants. In-practice, open-ended explorations can help architects erode habitual perceptions and practices thus encouraging innovative outcomes.

Development through rehearsals

In line with the performative understanding of places and place-making, this thesis suggests that computers help to manage creative,

collaborative performances by supporting rehearsals with rapid calculation, automation, simulation, retention and representation. The concept of creative rehearsals contains techniques of iterative development, for example through automatic generation of alternative geometries such as those developed during *The Parasite* project (e.g., see fig. 51, p. 186 and fig. 52, p. 187). In addition to such techniques, the concept of rehearsals emphasises that recurring experimentation takes place not only in simulative environments sustained by drawings or models but also in social situations involving multiple actants. Such situated, socially contingent rehearsals allow experimentation not only with the technical or sculptural aspects of architectural production but also with the tacit, emotional and rhetoric characteristics of in-design places.

Manipulation of complexity

The introduction of additional actants to designing, as advocated and caused by the performative-place approach, leads to highly complex design-situations. This complexity is further exacerbated by the introduction of open-exploration and iterative processes that can rapidly generate multiple, difficult-to-evaluate alternatives. This thesis explains how design computing can help to manipulate complexity in support of creativity. For example, *The Parasite* project (p. 188 et seq.) illustrates the management of complexity in a design solution that utilised numerous cellular components and had to balance multiple, disparate requirements. Other examples, also largely derived from *The Parasite* project, demonstrate how design computing can help to manipulate complexity by 1) utilising procedural and generative techniques; 2) employing targeted punctualisation achieved through custom programming and interface design; 3) selectively bounding the experimental design-space through introduction of procedural constraints and parameter-linking; 4) developing complementary, layered representations of observational, analytic, simulated or arbitrary data; and 5) managing materialisation and logistics.

Non-destructive, computer-enabled techniques allow great flexibility in the search for consequences of design decisions. This flexibility erodes existing, habitual boundaries between stages of designing al-

lowing architects to undertake such tasks as massing and detailing simultaneously. Better integration between traditionally distinct design tasks helps designers to motivate and evaluate their moves in pursuit of more challenging and better sustained solutions. I argue that these techniques not only make feasible manipulation of complex situations but also help architects to tolerate ambiguity and, consequently, support creativity.

Flexible feedback and evaluation

The increased complexity of design challenges encouraged by the performative-place approach and the possibilities of design computing necessitate the development of better feedback and evaluation. My case-studies demonstrate that design computing can support multi-modal feedback, compatible with the requirements of distributed creative-processes. *The Parasite* project in particular shows how this feedback helps architects to reflect upon and critique their own actions, communicate with team members and engage with other stakeholders (e.g., see p. 198).

Translation

The case-studies in this thesis demonstrate that design computing can aid translation between multiple, heterogeneous participants, existing domains of practice or multiple, disparate concerns arising during an architectural project. Examples of techniques that this thesis interprets as contributing to the tasks of translation include designing based on multi-purpose digital models, rapid prototyping and punctualisation. For example, punctualised interface-controls that hid the underlying technical-complexity in the *Virtual West Cambridge* and *Virtual Braunstone* projects allowed easy, public manipulation of these virtual environments in support of diverse design-discussions. The suitability of design computing for the support of translation adds to my overall argument for the re-evaluation of design computing as an enabler of collaborative, distributed creativity necessary in place-making.

Performative thinking and learning

Even though academia increasingly acknowledges the value of tacit knowing, approaches that use design computing in support of tacit knowing in architecture are still rare. In order to encourage further exploration, this thesis offers a theoretical approach that interprets design computing as an integral part of the creative process thus opening new possibilities for the study of representation and communication in place-making as well as for the practical development of new techniques and tools.

Seen within the context of place-making performance, design computing emerges as an activity able to support tacit knowing in rapidly changing and complex environments. In order to describe these capabilities, this thesis suggests an extended understanding of graphic thinking as performative thinking. The accrual of meaningful change through repetitive engagement with visual, dynamic material is meaningful as a situated practice that involves expertise, emotional engagement, inter-actant communication, compromises and learning. *The Parasite* demonstrates procedural workflows that combine contributions of machines and humans into distributed-intelligence engagements able to support performative thinking. For example, computation can help designers to expose, compare, sample, preserve, bring into discussion with others and adjust tendencies emerging from the flows of automatically-generated alternatives. Procedural three-dimensional modelling can function with flexibility similar to that of sketching with traditional materials such as paper, charcoal or watercolours. In this mode, computing can provide rich and dynamic multisensory feedback in support of rapid, intuitive modifications; free associations and serendipity (e.g., see p. 204 et seq.). Integrated into designing in support of performative thinking, these techniques can contribute to experiential learning or dwelling in the work thus engaging, informing and guiding designers' intuition. In another benefit, utilisation of custom-made computational tools encourages reflection by challenging designers' ontological assumptions and encouraging practical re-imagining of situations thus eroding stereotypes and assisting in reframing of design challenges.

Architects traditionally delegate the process of making to other professionals, communicating their ideas to builders through drawings, specification and models. Utilisation of computer-aided manufacturing helps to reconnect architects with the performances of making helping them to recognise additional opportunities and better evaluate their implications.

Based on my experience with hybrid workflows highlighting the relational, social meanings of design computing, this thesis suggests that architects can conceptualise computers as creative partners rather than as obedient tools and that as partners, computer-supported entities can act in useful roles that extend beyond those accounted for by functionalist interpretations. Concepts such as that of an aid, a tool or an amplifier fail to capture the complexity of relationships that sustain technologically-supported, distributed creativity. Engaging in computer-enabled design methodologies such as procedural design, architects become cyborgs whose capacities for perceiving, understanding, remembering and imagining partially reside in technologies. An understanding of computational entities as creative partners calls for changes in architectural education and practice highlighting the need for better expertise in the theory and practice of computing.

Campaigning

Computing can support place-making creativity because it helps to campaign for participation and stage new relationships. My case-studies confirm that persuasive communication is essential in campaigning for inclusive participation. The understanding of computers as instruments of campaigning acting in support of expert designers as communicators, catalysts, facilitators and inspirational leaders, expands the understanding of computers as efficiency-improving tools. For example, in contrast to more usual utilisation of form-finding for structural optimisation (e.g., see Felicetti et al., 2006; Shea et al., 2001), I highlight the role of generative form-finding as a reframing device that produces provocative outcomes meaningful through the responses of participants. Accessible design and construction processes enabled by computing also become sites for campaigning, witnessing and translation. For example, *The Parasite* project (p. 214 et

seq.) illustrates the possibility and benefits of interpreting the process of construction as a multi-faceted performance.

Polyphony

This thesis develops an understanding of design computing that differs from the sceptical, functionalist vision of computers as tools for the production of drawings as well as from the optimistic attempts to automate most of the design-process (e.g., see Vanderfeesten and de Vries, 2006) or guide architectural practice with objective quantitative-evaluation (Hillier, 1996; e.g., cf. Hillier and Hanson, 1984).

Instead, this thesis interprets design computing as a significant voice among many other significant voices in the design process. My case-studies confirm that computer-supported, polyphonic representation helps to highlight the heterogeneous and contradictory nature of relationships in places thus making them more meaningful and open to a greater scope of existing and potential stakeholders. The constructive utilisation of representation for place-making, as suggested by this thesis, includes innovative techniques employing simultaneous, multi-modal, located media organised in dramatic encounters with cinematic and narrative techniques.

Even experts can struggle to imagine future places based on the content of architectural representations. Other participants often find this challenge all the more difficult. This thesis demonstrates that computation can support multiple, simultaneous representations catering to the varying needs and backgrounds of stakeholders. In particular, my case-studies illustrate the capabilities for flexible representations afforded by real-time, navigable environments. Functioning as inclusive multi-media hosts, such environments can incorporate multiple viewpoints and support multiple experiential-interpretations of places using avatars, multiple cameras and audio-visual effects. For example, the *Shenmue II* game suggests directions for further work by utilising its polyphonic representation-devices in support of its dramatic narratives (e.g., see p. 221 et seq.). *Virtual Cuthbert Hall* (e.g., see p. 223 et seq.) demonstrates that multiple presentation-modes, embedded in one virtual environment, can provide combined benefits by giving access to additional expressive-resourc-

es. The implementation of polyphonic representation in support of an architectural project in *Virtual Braunstone* (e.g., see p. 236 et seq.) confirms that distinct modes of access can usefully supplement each other by supporting narratives, allowing empathy, locating diagrammatic and textual content and encouraging experients to learn by doing. Using these and other examples, this thesis argues that, because of their polyphonic capabilities, the narrative and dramatic capacities of such environments are particularly suitable for creative conversations in and about places.

Further work on design computing and distributed creativity

I have suggested that my performative-place approach can support creative place-making using adaptive, process-based and parametric techniques. Further practice-based research will develop this promise and consider design techniques necessary to produce soft, distributed and multiplicious architecture. My future *Adaptive Architecture* project, already supported by research funding, is an example of possible work in this direction.

V.3.3 Reflection on contributions

The constructivist epistemological-stance adopted in this thesis leads to findings and contributions formally recognised by the current research guidance. According to the UK Research Assessment Exercise documents (Research Assessment Exercise 2008, publ. in 2005, p. 34), research

> for the purpose of the RAE is to be understood as original investigation undertaken in order to gain knowledge and understanding. It includes work of direct relevance to the needs of commerce, industry, and to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performances, artefacts including design, where these lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes, including design and construction.

The same document (ibid.) defines scholarship as "the creation, development and maintenance of the intellectual infrastructure of subjects and disciplines, in forms such as dictionaries, scholarly editions,

catalogues and contributions to major research databases." In agreement with these definitions, my research contributes to knowing in multiple ways that complement the textual presentation contained in this thesis and the supporting moving-image representations submitted as an appendix.

Among the additional, significant contributions to knowing are the design artefacts and designed environments developed during the case-studies. Apart from (or even instead of) their roles as practically-functional objects, artefacts can give access to tacit knowing that is not otherwise sharable (e.g., cf. Rust, 2004). While it is not possible to give fully experiential, immersive access to my case-study places within the formal PhD submission, various incarnations of my case-study places as well as their representations continue being accessible to interested stakeholders and as such constructively contribute to the architectural discourse.

Design-knowing also resides in the activity of designing, in the reflection in and on design as well as in the use of tools, software and media. Practitioners create and access this knowing in their own practice. Others cannot access this knowing directly; however, indirect access is possible through design narratives, presentation of tool usage and design-process descriptions, access to design alternatives and other techniques that expose the context, toolsets or effects of design thinking. My thesis includes design narratives and I have made detailed project-descriptions publicly available in the form of published papers and presentations. My collaboration with individuals and organisations has afforded further access to this practical knowing.

Design-knowing is also inherent in the processes of manufacturing and construction. I made public part of this knowing in the technical description of *The Parasite* project, by means of my collaborations and through teaching. I am yet to report in publications on much of the knowing residing in manufacturing and construction. Currently, it is still inaccessible to peers beyond close collaborators. However, even in this condition it does propagate through local, interpersonal communications.

Finally, design-knowing resides in relationships among actants.

Practitioners and academics access it through exchanges in the communities of practice (cf. Duguid, 2005; Woo, et al., 2005). Contributing to this type of knowing, I have participated in many multidisciplinary communities through scholarly editions of journals and conference proceedings, catalogues, public presentations and exhibitions, online exposure and interpersonal communications.

The Research Assessment Exercise definitions do not explicitly mention influential web-based forms of knowledge retention and dissemination or significant temporary events such as international exhibitions that report on and form trends in digital art, academia, creative practice and industry. I have engaged with these additional means of dissemination and feedback gathering. The public exposure of my analysis and case-studies as well as ongoing collaborations with organisations and individuals have confirmed that both professionals and academics find the research outcomes offered by my methodologies useful for their theoretical and practical work.

My research is a case of an architect freely choosing to use technologies rather than an example of technologists studying practices of architects, artists or potential users in search of supposed needs. Often, the proposed solutions for these hypothetical needs fail to find subsequent utilisation. By contrast, the focus on case-studies helps other practitioners to relate research efforts to their own practice. Controlled laboratory-style experiments separated from the everyday action and focused on components at the expense of the whole are rare in practice and often fail to be directly relevant to the challenges of designing. Instead, practitioners engage with situations through experimental design moves and observe the feedback ready to adjust their actions or reframe their tasks if required. Thus, the strategy and tactics of participant observation and investigative designing are already familiar to practitioners, especially in architecture. This familiarity sets the ground for the direct transfer of techniques and ideas from academia into professional practice and the public sector. For example, my work in virtual environments has generated reports of usefulness and requests for further information from game designers, architects, property developers and planning authorities. Exam-

ples of collaborators exposed to the creative practices that I developed during my work on this thesis included the Estate Management and Building Service of the University of Cambridge, the National Health Service Estates and the Design Excellency Unit of the National Health Service as well as several architectural, engineering and landscape-architecture practices.

Becker (1982, p. x) wrote that "it [is] generally true that sociology does not discover what no one ever knew before, in this differing from the natural sciences. Rather, good social science produces a deeper understanding of things that many people are already pretty much aware of." Similarly, I do not claim that my research has produced any generalizable, previously-unknown truths. Instead, it reflects on the theory and practice of place-making in order to equip architects with a better understanding of in-practice investigation and the creative capabilities of computation. With this updated understanding, architects can extend their design practice to meet the difficult challenges of contemporary, technology-saturated places.

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APPENDIX: CASE-STUDY DESCRIPTIONS

Participant-Observation Case-Studies

This section provides background information on projects or situations that I studied as case-studies but with which I was not involved as an author.

Shenmue II

Shenmue II ((X-Box) UK Release, 2003) is a commercial, navigable, real-time, single-player, role-playing/adventure game with a sophisticated game-world, extended narrative structure and rudimentary but innovative utilisation of cinematic language and multi-modal engagement in a real-time setting.

SEGA released *Shenmue II* in the UK in 2003 and during several months of that year I played and studied *Shenmue II* intermittently with other work.

I played *Shenmue II* in the department studio in Cambridge, at the Department of Architecture, on an X-Box console.

AM2 was responsible for the development of *Shenmue II* and SEGA acted as the publisher. I was solely responsible for the participant observation, data collection and analysis for this case-study.

I conducted my study of *Shenmue II* in the context of other similar but smaller studies that reviewed a wide range of virtual environments in

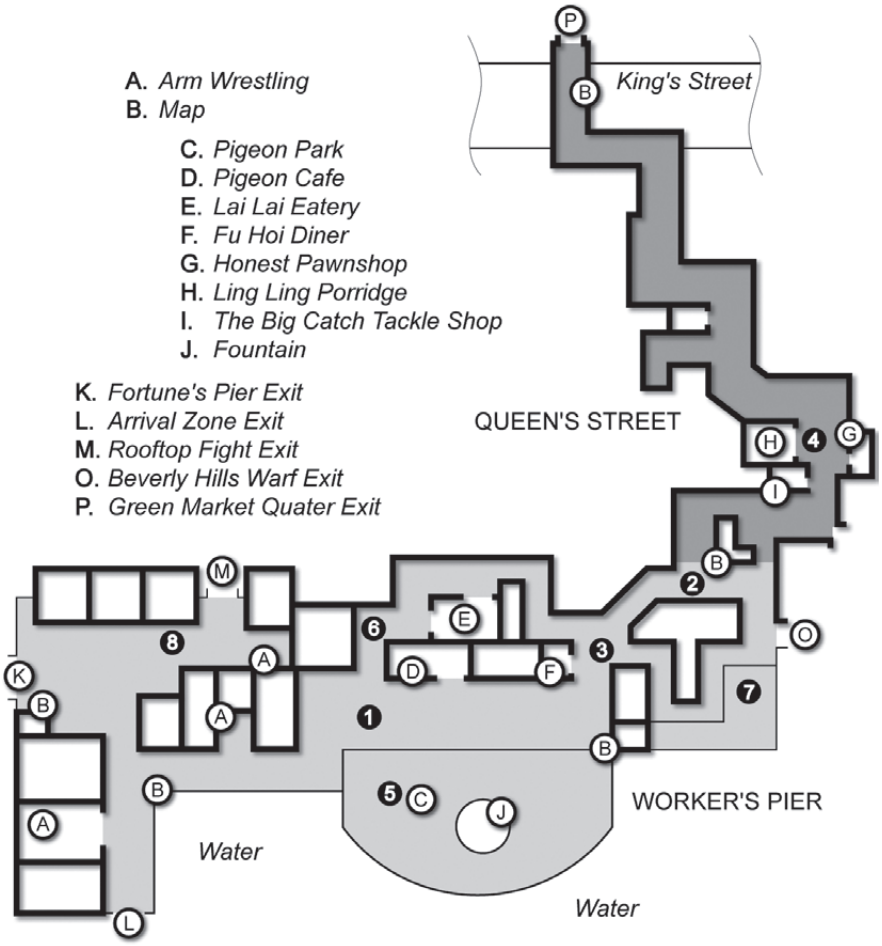


Fig. 118. *Shenmue II*. Wong-sequence map. An example of an in-game city district. I reverse-engineered this configuration from my in-game explorations and cross-checked it against numerous accounts of other players summarised as sketched maps or guides and available through online communities. My detailed analysis of this area and its narrative events contributed to the examples used later in this thesis. (digital drawing)

a variety of genres. This proficiency helped me to select *Shenmue II* as a characteristic example that features representational innovations.

Shenmue II incorporates a dynamic game-world that contains navigable environments, non-player characters and puzzles, tasks, mini-games and multimedia elements. The game system of *Shenmue II* incorporates time, money and communication structures used to manage the player progress. The designers coupled the mechanics of *Shenmue II* with a fictional, narrative base that provides an overarching storyline. The fictional content situates the game-world in relation to known geographies and cultures—thus creating a web of associations and expectations. In *Shenmue II*, the fictional base is a body of static pre-written stories that players disentangle as the game progresses. *Shenmue II* consists of four distinct locations: Aberdeen, Wan Chai, Kowloon and Guilain. Each includes a number of navigationally discrete but thematically and visually interconnected areas.

While the game uses fictitious geography that does not recreate Hong Kong neighbourhoods, primary game-sites borrow names of Hong Kong locations, local sites, such as eateries, use stereotypical Chinese names (fig. 118, previous page) and the cityscape utilises loosely Asian decor (fig. 82, p. 226).

I chose *Shenmue II* as a probe to study techniques that can help make virtual environments more engaging. Having selected *Shenmue II* for its widely acknowledged expressive qualities and innovative characteristics (cf. Fencott, 2001; Newman, 2002), I used it to study utilisation of fiction, drama and narrative in the context of real-time environments. In particular, my work aimed to conduct a detailed review of the narrative structure including its technique and meaning-making performance as well as an appraisal of the cinematic language utilised in the game. My analysis also sought to study interactions between pre-scripted and interactive content including, for example, observation of meaning-making patterns during in-control and out-of-control engagements with the game world (cf. Newman's (2002) "on-line" (ergodic) and "off-line" (non-ergodic) concepts devised to express the polar conditions of an experiential continuum of game-playing). Finally, the case-study focused on hybrid characteristics of game places, their socially-constructed, subjective character and the scope for multiple simultaneous interpretations.

To find answers to my research questions, I spent a considerable amount of time in the game, learning about its environment, following its narratives and solving its puzzles. After the completion of an episode, I captured my initial impressions in the form of diary notes. Having identified several sequences that were of relevance to my work, I played through them repeatedly, collecting visual documentation in the form of screen captures and video recordings. Later, I performed close-reading analyses of these sequences comparing the emerging observation with my original notes and the accounts of other players.

The consideration of *Shenmue II* was beneficial for my consideration of places and complementary to my other case-studies because it widened the scope of my review to include videogames, an area of creative place-making practice particularly rich in new forms of plac-

es. While, despite the recent efforts, the study of games is yet to form in a fully-developed academic field (e.g., see Eskelinen, 2001; Frasca, 1999), it is already clear that enquiries into game design and game playing can lead to learning about places significant to a wide range of constituents including the architectural profession.

I presented my work on *Shenmue II* as a paper at the Digital Games Research Conference in 2003 (Roudavski and Penz, 2003).

The outcomes of this case-study contributed to my practice-based research, particularly in the areas of real-time cinematography and utilisation of narrative structures in an interactive environment.

My work on *Shenmue II* and several other games using narrative episodes and cinematic representational devices[1] informed the subsequent design and analysis of *Virtual West Cambridge*, *Virtual Braunstone* and *Virtual Cuthbert Hall*.

Star Wars Galaxies

Star Wars Galaxies: An Empire Divided (hereinafter *Star Wars Galaxies*) is a commercial, online, persistent world that allows multiple simultaneous participations of many experients. The three-dimensional navigable environment of *Star Wars Galaxies* incorporates a strong background narrative borrowed from the Star Wars wide fiction-network (Bolter and Grusin, 1999; Craft, 2004; Howells, 2002) of films, books, comics, websites and games, an extensive social structure with its own economy and many game elements such as quests and contests.

LucasArts released *Star Wars Galaxies* after some delays in 2003 when the game already had several hundred thousand potential players registered on the official website. I played the game in 2003–2005.

I played *Star Wars Galaxies* in the department design-studio in Cambridge, at the Department of Architecture, on a powerful workstation. Apart from a small number of occasions, I played alone.

Sony Online Entertainment developed *Star Wars Galaxies* and LucasArts published it. I was responsible for the collection of all the re-

1. These games included Black and White (Black & White (PC (Win)) UK; USA Release, 2001), Max Payne (Max Payne (PC (Win)) USA Release, 2001), Resident Evil (Resident Evil (GameCube) JP Release, 2002), Star Wars Galaxies (Star Wars Galaxies: An Empire Divided (PC (Win)) USA Release, 2003) and others.



Fig. 119. *Star Wars Galaxies*. Planet Corellia. Forest in the proximity of Nyax's Cult hideout. The image illustrates a simulation of a natural environment typical for *Star Wars Galaxies*. The interface is off and the detailing of the terrain is at maximum. (screen capture)



Fig. 120. *Star Wars Galaxies*. Planet Corellia. Inside Nyax's Cult hideout. The image illustrates an interior of a building and a group of players engaged in a social exchange during a respite in a collaborative battle with non-player characters. A typical interface is on. (screen capture)

search material used in this thesis.

Star Wars Galaxies technical structure consists of many servers that differ in age, cater for different geographical regions and can implement different rule sets. Each player can join one of the servers and create two characters associated with one paying account. After a player creates the characters, no in-game communication with other servers is possible; they remain as parallel but invisible and inacces-

sible worlds. However, because the content provided by the game designers is similar between the servers, players can usefully communicate and congregate in communities that span the server divides.

Similar to most persistent online worlds, the functionality and content of *Star Wars Galaxies* are subject to constant change. When I regularly participated in *Star Wars Galaxies*, the in-game world consisted of 11 planets each carrying cities and simulations of natural habitats built by the game providers and populated by non-player characters of different functionality and strength. In addition, players could build their own objects and structures from weaponry and machinery, to mining installations and even whole cities.

The game world and its social structure are very complex and any meaningful engagement or progress in the game requires a lot of playing time. At the time of my participation, a player in *Star Wars Galaxies* could belong to one of 10 races and learn one or more of nine professions. This demand on player-time is also a consequence of the commercial nature of *Star Wars Galaxies* whose owners make more profit if more players spend more time in the game. Players stay in the world for various reasons but most of their in-game ambitions require a degree of character empowerment expressed in "experience points" and achievable through engagement in sole and group tasks.
In my engagement with *Star Wars Galaxies*, I sought to undertake a survey of in-game architecture and places and conduct an experiential study of how players learn about complex dynamic worlds. I also engaged in an ethnographic study of social place-making and the role of dramatic and narrative elements in this process. In addition, I conducted an exploratory study of the representational apparatus in the context of a massively-multiplayer online game.

To collect research data during my participation in *Star Wars Galaxies*, I kept informal player-diaries that included visual material in the form of static screen captures and moving images (similar to fig. 119, previous page and fig. 120, previous page). For the duration of my engagement, I simultaneously maintained two dissimilar characters in order to diversify my experience. I returned repeatedly to locations that hosted unusual or interesting events (such as the scuffle in the

difficult to access Nyax's Cult hideout, fig. 120, p. 308), documenting the circumstances in which they occurred. When travelling to socially, architecturally or narratively promising destinations, I used automatic logging that, working in the background, captured visual evidence of my progress at regular time intervals. This technique allowed me to return to the captured images of an event for analysis without having to interrupt the flow of interactive events for data collection. I also reviewed a large number of player-generated content online and conducted informal interviews in- and out-of-game with a variety of players.

I chose to consider *Star Wars Galaxies* as one of my case-studies because it allowed me to consider a virtual environment that already supported a vibrant and diverse social life. *Star Wars Galaxies* belongs to an increasingly important type of virtual environments. At the time of my engagement *Star Wars Galaxies* was one of the most popular online virtual environments that attracted millions of players. It sustained a persistent, changing and growing world and participated in a contemporary fiction-network that spread across multiple media types. These characteristics allowed me to observe and engage in new types of places and gain further experiences that contributed to the development of my performative-place approach.

I have not yet had a chance to formally present my work on *Star Wars Galaxies* but plan to do so in the future. In this thesis, I used this case-study to support and illustrate my argument in a variety of places. However, limitations of space forced me to exclude detailed analyses of *Star Wars Galaxies*' performative-sequences from this thesis.

My experience in *Star Wars Galaxies* contributed multiple interesting observations many of which suggested further practice-based research. In particular, my engagement confirmed that *Star Wars Galaxies* consisted of and helped to support a great variety of living places. Places in *Star Wars Galaxies* were hybrid and widely distributed. Physical locations from which players accessed Star World Galaxies and the company in which this happened dramatically change the experience of its places. Individuals' interpretations of places in *Star Wars Galaxies* are always partial and highly subjective. *Star Wars Galaxies*

sustained prolonged and committed human habitation that involves a broad gamut of involvements. I concluded that a predictive study of such involvements was impossible. Similarly to the studies of traditional places, the study of *Star Wars Galaxies* required ethnographic, anthropological techniques. In terms of representational apparatus, I discovered that *Star Wars Galaxies* did not use sophisticated cinematography. However, the potential for further utilisation of representational devices was evident in its game world. The technological base of the world already supported a large degree of flexibility in how players saw, heard and engaged with the in-game environments. Finally, *Star Wars Galaxies* had a pronounced processual character. Designing of its world was a continuously ongoing, irrepressibly contested and yet tightly controlled affair. As a model for place-making, the design process of *Star Wars Galaxies* was simultaneously suggestive and disturbing.

My experience with *Star Wars Galaxies* was instrumental in the development of my approach to places with its emphases on the lack of unity and centrality, the subjective and conditional character of place-making, the fuzzy boundaries of places and multiple, intermittent time streams of place-events.

Investigative-Designing Case-Studies

This sections provides background information on case-studies that incorporated significant investigative-designing component.

Virtual West Cambridge

Virtual West Cambridge is a real-time three-dimensional representation of a large-scale, long-term architectural development at the West Cambridge site, a growing campus of the University of Cambridge. The *Virtual West Cambridge* three-dimensional navigable environment supports publicity and development for the Estate Management and Building Service, a division of the University of Cambridge, and for other project consultants.

The *Web-based Participation for Campus-scale Project Design* project—the predecessor and parent to *Virtual West Cambridge*—

continued from 2000 until 2003. The *Virtual West Cambridge* project started in 2001 and is continuing at the time of writing (winter 2008). From time to time, when the need arises, we update the content and interface of *Virtual West Cambridge*, add new elements and stage new presentations.

Virtual West Cambridge is a real-time three-dimensional environment that can run on an average personal computer. During the project's lifetime, we experimented with several development platforms. Working prototypes run in the engines developed by Green Dino,[2] Funatics Development,[3] Criterion Software[4] and Epic Games.[5] The current implementation uses Virtools[6] engine extended with additional functionality that we wrote in C++.

The Martin Centre and the Cambridge University Moving Image Studio (aka The Digital Studio)[7] of the Department of Architecture, University of Cambridge jointly hosted the *Web-based Participation for Campus-scale Project Design* and the *Virtual West Cambridge* projects.

Engineering and Physical Sciences Research Council funded research on the *Web-based Participation for Campus-scale Project Design* project. The Estate Management and Building Service, University of Cambridge, co-financed the development of *Virtual West Cambridge*. They continue financing the project at the time of writing (winter 2008).

I worked on the project from its inception, acted as the project leader and was responsible for all design and implementation tasks. Paul Richens acted as a primary investigator on the *Web-based Participation for Campus-scale Project Design* project with Simon Ruffle participating as a key team-member. François Penz (a director of The Digital



Fig. 121. ***Virtual Computer Laboratory*, West Cambridge. Interior of an early model using Quake II (PC (DOS) 1997) engine. (screen capture)**

2. http://www.greendino.nl We used their custom engine oriented towards architectural environments.
3. http://www.funatics.de We used their development tools written for Zanzarah (Zanzarah: The Hidden Portal (PC (Win)) 2002).
4. A now defunct middleware solution purchased and subsequently discontinued by Electronic Arts (http://www.ea.com).
5. http://www.epicgames.com At the time, we experimented with their Unreal 1 engine.
6. http://www.virtools.com/
7. After a reorganisation, the Cambridge University Moving Image Studio became The Digital Studio and assumed its responsibilities for conducting research. For consistency, later in this thesis I only use the name The Digital Studio.

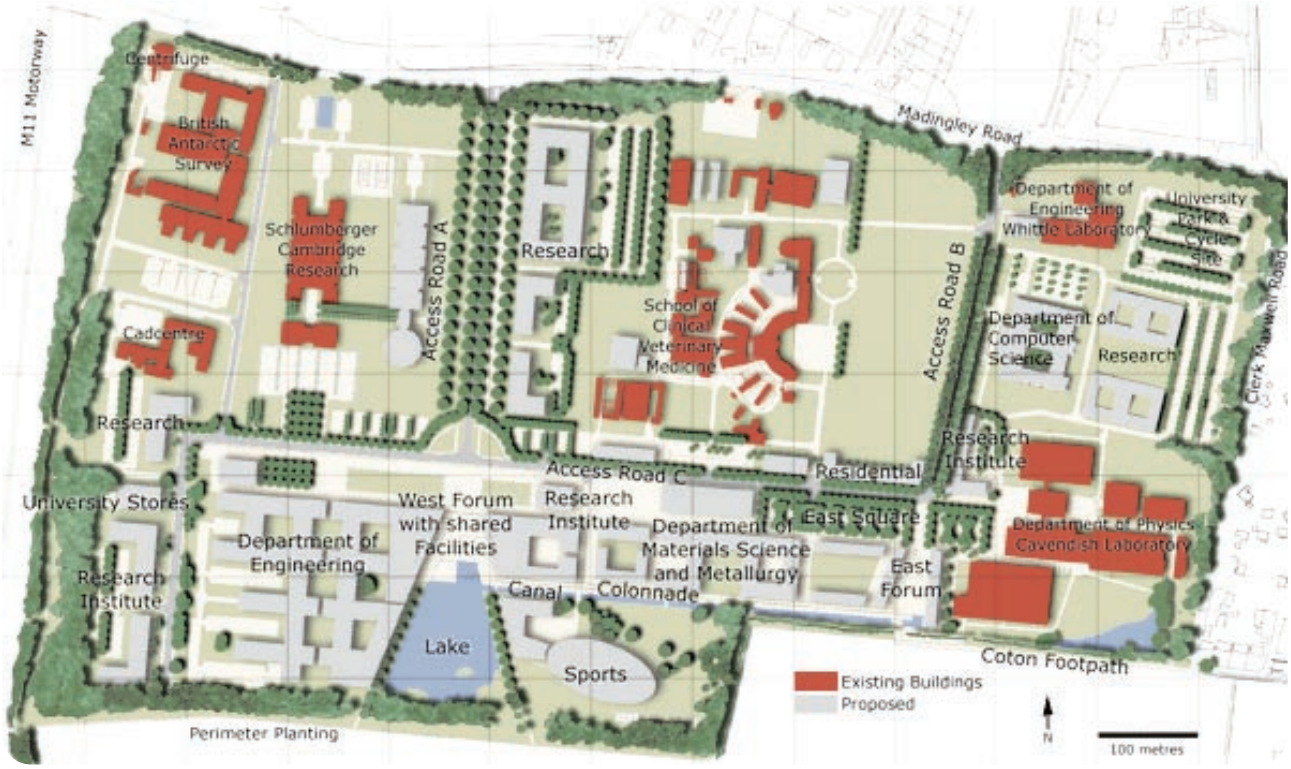


Fig. 122. West Cambridge master plan as proposed by architects from MacCormac Jamieson Prichard and approved by the university and the planners in 1999. (digital drawing)

Studio) acted as a co-investigator on this parent project and coordinated the work on *Virtual West Cambridge*. Jonathan Mackenzie (then a researcher at The Digital Studio) helped to design and program the traffic simulation. Michael Nitsche (then a PhD candidate at The Digital Studio) helped to design and program the interface. In the later stages of the project, Giorgos Artopoulos (then a PhD candidate at The Digital Studio) modelled some of the new buildings. The Estate Management and Building Service of the University of Cambridge acted as a client. Architects, landscape architects, road engineers and other consultants provided advice and information on individual buildings and the landscape.

Before I began working on the *Virtual West Cambridge* project, Paul Richens and Michael Trinder at the Martin Centre, University of Cambridge, built a model of the Computer Laboratory (now William Gates Building), one of the new buildings on the West Cambridge site.[8] The project used *Quake II* (Quake II (PC (DOS)) 1997) game engine and freeware development-tools. *Virtual Computer Laboratory* (fig. 121, previ-

8. For further information on this project, see Richens and Trinder (1999) and Richens (2000).



Fig. 123. *Virtual West Cambridge*. Panoramic view of the model. (screen capture)

ous page) repurposed several interactive features previously used in *Quake II*. The model looked promising to the site developers and future users of the building even though its visual appearance and interactivity were very basic. Game-characters supplied with *Quake II*, partially remodelled and retextured, acted as experients' avatars. Researchers removed their weapons and provided them with basic gesture-vocabulary. *Virtual Computer Laboratory* had a basic soundscape and inherited *Quake II's* multiplayer capabilities.

The encouraging response to the *Virtual Computer Laboratory* experiment and the general interest in using game engines for architectural applications encouraged initiation of the *Virtual West Cambridge* project. Another motivation came from the Estate Management and Building Service who were responsible for the development of the West Cambridge site and wanted to replace the existing physical model with a more flexible digital solution. In response to these motivations, *Virtual West Cambridge* began as an integral part of the *Web-based Participation for Campus-scale Project Design* research project (Ruffle and Richens, 2001) that focused on making architectural and engineering information deliverable on the web to non-technical audiences. I joined the team as a research assistant and spent one year exploring utilisation of moving-image and real-time content in architecture, collecting multi-modal data from the consultants and building three-dimensional models of the West Cambridge landscape and buildings.

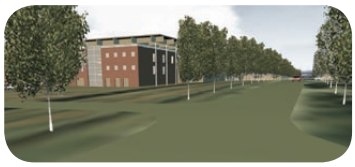


Fig. 124. *Virtual West Cambridge*. View towards William Gates Building along JJ Thomson Avenue. The image shows the curvature of the terrain mapped with an aerial photograph, billboard trees and the three-dimensional geometry of the road network overlaying the terrain. (screen capture)



Fig. 125. *Virtual West Cambridge*. This view shows the modelled buildings <middle> of new designs in combination with coloured blocks <foreground and background> that denote locations and approximate volumes of the future buildings as defined by the master plan. (screen capture)

The West Cambridge site[9] is one of three major campus areas currently developed by the University of Cambridge. MacCormac Jamieson Prichard Architects[10] prepared the master plan for the West Cambridge site in 1999 (fig. 122, p. 313). The university expects to continue the development of this site for at least 20 years.

The work on the *Virtual West Cambridge* project resulted in the development of a real-time three-dimensional virtual environment that included a variety of content. The three-dimensional digital-terrain (fig. 124, previous page) based on survey drawings showed major undulations of the ground surface helping to achieve accurate views across the site. It featured smaller landscaping, including ditches, mounds, ponds and similar only in strategic locations near important buildings. Modelling of detail landscaping proved a major challenge because the descriptive information was incomplete and difficult to interpret, manual effort required to achieve good-quality models was significant and the complexity of the resulting geometry threatened to overburden the real-time-rendering capacity of available hardware.

Photographs and procedural models allowed us to generate appropriate species of plants (e.g., see fig. 123, previous page and fig. 124, previous page). Procedural generation of vegetation promises interesting opportunities for dynamic visual-exploration of landscape designs but is also time-consuming and labour-intensive. Subsequently, working on *Virtual Braunstone* after the experience of *Virtual West*

9. http://www3.arct.cam.ac.uk/westc
10. http://www.mjparchitects.co.uk

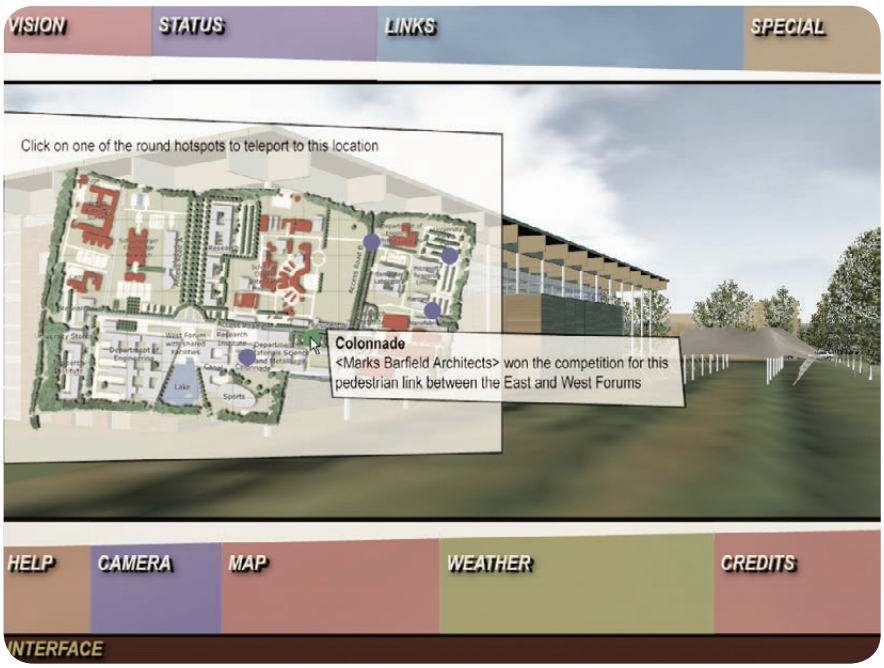


Fig. 126. *Virtual West Cambridge*. Two-dimensional interface overlaying the three-dimensional view of the model and showing, in this case, two-dimensional schematic map of the site with active hotspots allowing instantaneous relocation. "Interface" bar at the bottom of the screen was always visible. When an experient approached a location with associated content, the bar flashed indicating an opportunity for multimodal exploration. The experient could ignore or accept this invitation. When the experient clicked on the "Interface" bar, the system displayed the other two other control panels containing links to context specific information. Thus, activating the interface in the proximity of the Computer Laboratory building gave access to information on its development and construction in combination with information on the site in general. (screen capture)

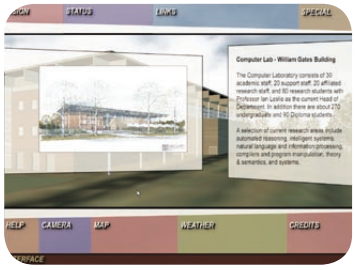


Fig. 127. *Virtual West Cambridge*. Integration of text and images. Here, an early promotional sketch by the architects, MacCormac Jamieson Prichard, activated with a click on the "Status" button. (screen capture)

Cambridge, we opted for simplified, cartoon-like visualisation of trees that still allowed representation of densities and massing (e.g., see fig. 90, p. 230; fig. 92, p. 230 and fig. 105, p. 235). In the future, *Virtual West Cambridge* might acquire this type of representation as an optional alternative to its existing, more realistic style. We extracted road outlines from two-dimensional survey drawings and fitted them to the terrain. *Virtual West Cambridge* incorporated three types of virtual buildings corresponding to the grouping defined in the master plan. Simple geometry with photographic textures represented existing buildings. Custom-built, textured, three-dimensional models represented the buildings newly designed for the site (fig. 125, previous page). Colour-coded blocks showed approximate positions and proportions of buildings in pre-design stage (fig. 125, previous page).

Virtual West Cambridge incorporated three modes of navigation, each using distinct camerawork. The first mode allowed experients to fly through the environment freely, at arbitrary heights, directions and speeds (e.g., see fig. 125, previous page). The second mode featured a third-person camera that followed a human avatar moving atop the terrain with realistic speeds (e.g. see fig. 130, p. 318). The third mode associated navigation with moving vehicles; the cameras of this mode allowed the simulations of the straight-ahead views of

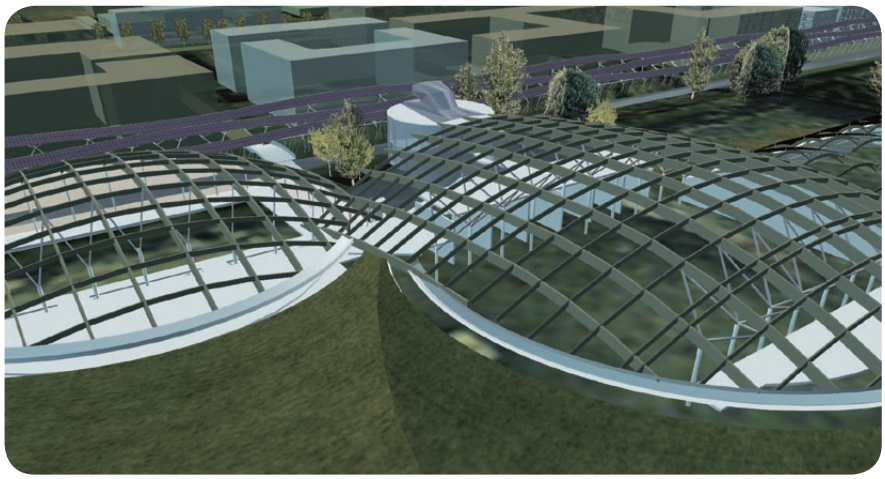


Fig. 128. *Virtual West Cambridge*. The image demonstrates the possibilities for the display of alternatives including speculative projects and demonstration of interesting features of the buildings. In the foreground, experients could hide the grass roof of the proposed Sports Centre to reveal its structure. We used this capability to support discussion of this innovative project during public consultations. The wavy bands on the top of the image are the Colonnade project intended to separate West Cambridge from the green belt. Due to the financial difficulties that have emerged since the completion of the Colonnade's design, it is not clear if the university will build it, however it survives within the model as a historic record of design development and as a provocation for discussions on several topics including sustainability, aesthetics and financing. (screen capture)

the drivers or 360-degree views of the passengers. *Virtual West Cambridge* also incorporated a two-dimensional interactive interface, conceptually similar to those used in videogames but unusual for architectural visualisations (fig. 126, previous page and fig. 127, previous page). Incorporation of the interface allowed flexible development and integration of multimedia, context-sensitive content. Multiplicious representation supported various design-narratives (e.g., see fig. 128, this page) that could reside within the virtual environment or be delivered by human participants in support of presentations and discussions in public settings.

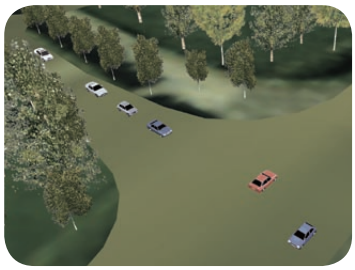


Fig. 129. *Virtual West Cambridge*. Traffic simulation. This image shows the cars waiting at a junction of primary and secondary roads. (screen capture)

A traffic simulation (e.g., see fig. 129, this page) integrated into the model used the algorithms employed to evaluate vehicle flows. This simulation differentiated between road types providing for different speeds and supported automatic navigation through the junctions. Despite realism, its primary purpose was to contribute to the visual and experiential engagement. Consequently, our implementation did not take into account complex road laws, bicycle and pedestrian traffic or idiosyncratic behaviour of people. Instead, the traffic simulation enhanced the atmosphere of *Virtual West Cambridge* by providing an impression of background activity, enhanced appreciation of the multiple ways of engagement with the site by providing views on and from the moving vehicles, encouraged access to unobvious locations in the model and generally demonstrated the potential of simulations integrated into multi-modal representations of architectural environments. It also motivated the development of reusable simula-

tion-building tools with visual controls.

In order to demonstrate the potential for multiplicity of representations within one virtual environment, we also implemented simple weather simulations such as fog and snow (fig. 130, this page). In spite of their simplicity, these simulations proved successful in generating interaction among participants during various public presentations.



Fig. 130. *Virtual West Cambridge*. **The image shows fog and snow simulations that we used to demonstrate different weather conditions and educate our clients and other potential stakeholders about the expressive possibilities of virtual environments. This image also demonstrated the 3rd-person point-of-view camera used to follow the avatar. (screen capture)**

Through the *Virtual West Cambridge* project, I sought to understand the implications of development and maintenance of long-term virtual environments, especially those linked to ongoing architectural developments. This work aligned with the directions of the *Web-based Participation for Campus-scale Project Design* parent project that researched techniques for processing architectural and engineering information for web publication to a non-technical audience, one not accustomed to planning or construction terminology or conventions. In architecture, long-term, continuously-advancing virtual environments, existing in support of ongoing site-development, are unusual. Consequently, their design, development and maintenance pose interesting and difficult challenges in terms of funding, maintenance of content, technological innovation and utilisation in collaborative practice. *Virtual West Cambridge* also helped me to consider the suitability of available development-tools in prolonged practical usage. Exploring the utility of such tool is interesting because architects still do not use them widely and the profession remains largely unaware of the difficulties and potentials their utilization implies. Finally, the project helped me to stage and observe multiple, unobvious utilisations of real-time environments in support of long-term urban-scale architectural developments.

In comparison to my other virtual-environment case-studies, the *Virtual West Cambridge* project was unique in terms of its duration, scale, the frequency of its public exposures and the closeness of collaboration with a broad range of professional consultants that it required. It was particularly useful as a link with the complexities of the practical, professional world.

Investigative designing constituted the primary research-engagement with *Virtual West Cambridge*. Additionally, during approxi-

mately one year, I was present at weekly project meetings of the West Cambridge development-team held by the Estate Management and Building Service at their offices. All major consultants also attended these meetings. Notes and observations that I collected during these conferences informed the development of *Virtual West Cambridge*, its utilisation in practice and helped me to formulate targets for reading and research. During public presentations, I collected notes on the layout and the interactions with the participants including informal interviews with various constituents. Throughout my work on *Virtual West Cambridge*, I preserved multiple versions of the virtual environment and took notes on their implementation and usage. These data enabled comparative analysis of various technical and social configurations and encouraged further experimental development.

Individually or jointly with my colleagues, I presented *Virtual West Cambridge* at a number of public events such as the Estate Management and Building Service Open Day events, Cambridge 2002, 2004; New Media Knowledge Synthesising Reality Event at The British Academy of Film and Television Arts, London 2003 and 3D Event organised by London Technology Network, London 2006. In addition, through the years *Virtual West Cambridge* was accessible to many professional and academic peers in more smaller-scale presentations held at our studios, during conferences, seminars and workshops. These public engagements allowed me to collect valuable feedback and contribute to the emergent or ongoing discourses on virtual environments.

The longevity of the project confirmed the usefulness of virtual environments in large-scale architectural projects and provided a unique test-bed for experimentation, innovation and collection of feedback. At the moment of writing (winter 2008), the *Virtual West Cambridge* project continues to foster learning and support practice of its formal client, the Estate Management and Building Service. Their continuing funding and usage confirm that the expertise derived from the project successfully transfers from academic research into architectural and urban-planning practice. Through *Virtual West Cambridge*, the Estate Management and Building Service were able to promote the West Cambridge site, educate the university members and other

stakeholders about the West Cambridge master plan, illustrate the ongoing development of the master plan, publicize the Estate Management and Building Service as a forward-looking organisation and contribute to the development of new fundraising initiatives.

Virtual West Cambridge also contributed to the advancement of shared knowing useful to wider architectural research and practice. The project contributed to the practical expertise enabling real-time three-dimensional representations that make complex architectural and urban-planning proposals accessible and attractive to lay audiences, especially those familiar with videogames. This expertise included data on the suitability of game engines and middleware to the purposes of architectural urban-planning representations. Another useful outcome was in the development of environment-building workflows including data collection in collaboration with multiple consultants, organisation of content, reworking of content to suit the needs of real-time representations and techniques for efficient maintenance of virtual environments. The project also contributed approaches to multi-modal representation involving two-dimensional, three-dimensional and audio elements; strategies for the incorporation of drama and narrative; and tactics for public dissemination that integrate real-time three-dimensional environments into public performative-events.

The *Virtual West Cambridge* project elucidated that realistic representations are difficult technically, prohibitive financially and exorbitant in terms of required man-power. While they remain highly subjective, they give impression of objectivity and completeness, often misguiding participants and undermining the usefulness of project negotiations. Realistic representations can be particularly misleading when designers do not employ interactivity in its support, when the authorship of the environment and the mode of its production are unclear and when the broader constituency of potential stakeholders does not have opportunities to contribute alternative views on the environment.

Not only realistic, but all representations and simulations present contradictory and non-trivial challenges that bias their output. *Vir-*

tual West Cambridge confirmed that interpretation is an inescapable part of representation. Even with huge resources towards the development of interactivity, virtual-environment developers cannot transfer the life of the site, such as that of West Cambridge, into a virtual world. Consequently, *Virtual West Cambridge* encouraged the search for alternative ways of thinking about technology-supported places by highlighting the limited, subjective and constructed nature of virtual environments. Instead of emphasising realism of virtual environments as representations or simulations, I began to consider virtual environments as extensions of the performances occurring in places they set out to simulate.

My experience of working on the prohibitively-complex terrain, roads and vegetation for the *Virtual West Cambridge* also pointed to the need for representations that could support multiple alternative points of view, target resources to selected, significant issues and be forthright about the inherent deficiencies of their implementations.

The appreciation of *Virtual West Cambridge* as a series of performative place-making engagements suggested the need to acknowledge in practice the value of make-belief and the potential of virtual environments for drama and storytelling. *Virtual West Cambridge* also demonstrated the helpfulness of open design and production processes accessible for scrutiny by multiple stakeholders and showed the advantages of clarity about the origins and intent of design messages. By bringing participants into communication during public events or issue-specific consultations, the project demonstrated inescapable co-presence of alternative worldviews belonging to the diverse stakeholders and assisted in the exposure of complementary or contrasting attitudes. In support of these goals, it suggested further development of multi-modal communication able to aid interactivity with non-real-time multimedia content. Simultaneously, it highlighted the value dissemination techniques supporting experiential, embodied and shared experiences between invested participants rather than passive attendances by sceptical spectators.

The *Virtual West Cambridge* project provided a continuously advancing benchmark for my subsequent research work bringing out

many issues for future research. At the same time, the techniques and knowing gained in other parallel projects benefited the development and utilisation of *Virtual West Cambridge*.

Future work on *Virtual West Cambridge* will extend the efforts towards wider participation and dissemination, for example, through academic papers. Amongst the potential future experimental work are the implementation of multi-user features, the development of a persistent environment and further utilisation of *Virtual West Cambridge*, for example, in education or fund-raising.

Virtual Cuthbert Hall

Virtual Cuthbert Hall is an imaginary Cambridge college with fictitious history beginning in the fifteenth century. *Virtual Cuthbert Hall* resembles traditional Cambridge colleges architecturally and functionally hosting activities representing research, teaching and multifaceted social life.[11] A visitor accesses to *Virtual Cuthbert Hall* through a protagonist, an avatar with a characteristic attitude and idiosyncratic goals. Situated dramatic encounters punctuate user-controlled navigation. These dynamically triggered place-events confirm, modify or refute meanings suggested by *Virtual Cuthbert Hall* architecture. The spatial narrative immerses the experients in a real-time performance casting virtual objects and locations as dramatic forces operating as a mediation framework.

Project development continued intermittently from 2001 to 2003. After that period, I returned to the project periodically in order to disseminate its results and use its outcomes in further work.

Virtual Cuthbert Hall is a real-time virtual environment that could run on an average 2001 personal computer. We experimented with several three-dimensional real-time rendering engines and authoring environments. The primary implementation used Criterion's Renderware three-dimensional graphics engine and the game engine developed by Funatics Development for their game Zanzarah.

The Digital Studio, Department of Architecture and Centre for Ap-

11. Leedham-Green, a Cambridge historian helped us to develop a plausible history of Virtual Cuthbert Hall (for her brief history of Cambridge, see Leedham-Green, 1996).



Fig. 131. *Virtual Cuthbert Hall.* **View towards the entrance Gate. (hidden-line rendering)**

plied Research in Educational Technology, University of Cambridge supported the project.

Higher Education Funding Council for England provided the necessary funding.

I joined the project at an early, pre-design stage and, together with Michael Nitsche (then a PhD student at The Digital Studio), formulated the project's goals to represent our combined research interests. The subsequent work was also collaborative. Together, we were in charge of conceptual design, formulation of research questions, general direction and production, spatial design, interactivity design and programming. In addition to this, I was individually responsible for architectural design and three-dimensional modelling. Two other collaborators were Jonathan Mackenzie (then a researcher at The Digital Studio), who helped with the programming tasks and Karina Gretere (a composer), who produced the soundscape to our specification. François Penz and Maureen Thomas (then a Creative Director at The Digital Studio) provided advice and guidance.

I took part in the *Virtual Cuthbert Hall* project after completing the initial stage of my doctoral research and submitting the first-year paper. After this work, I was aware of the deficiencies in the discourse on space and place, particularly concerning virtual environments. After the extensive review of virtual environments produced in different fields, I was also familiar with the shortcomings of their narrative

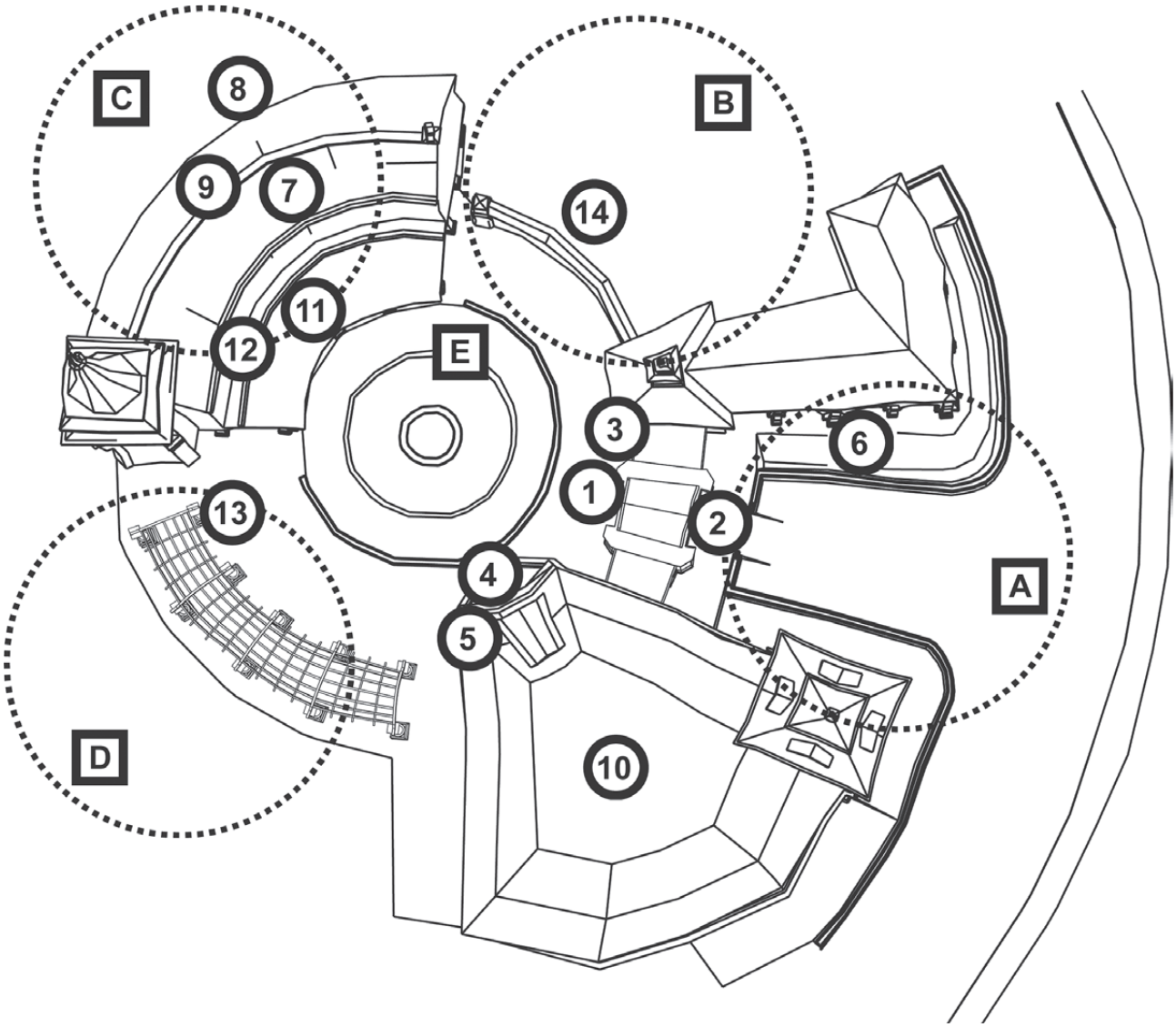


Fig. 132. *Virtual Cuthbert Hall*. **Schematic of content locations. [A] Street, [B] Garden, [C] River, [D] Backs and [E] Courtyard are zones with distinct moods. (hidden-line rendering)**

Theme	No.	Event	Location	Period
Novice	1	Entry	Porter's Gate	Timeless
	2	Welcome	Porter's Gate	Timeless
	3	Chatting porters	Porter's Gate	Timeless
Work	4	Lecture	Living Quarters	16th century
	5	Typewriter	Living Quarters	20th century
	6	Success	Living Quarters	20th century
Friendship	7	Dining	Dining Hall	Timeless
	8	Boat race	Dining Hall	Timeless
	9	May ball	Dining Hall	Timeless
	10	Return	Living Quarters, trigger at Dining Hall	1945
Quarrel	11	debate	Dining Hall Colonnade	19th century
	12	Choir rehearsal	Dining Hall Colonnade	18th century
Death	13	Air raid	Dining Hall, trigger at Backs	1940s
	14	Mourning	Garden	17th century

structures and cinematographic strategies. Seeing the potential demonstrated by game designers, in the *Virtual Cuthbert Hall* I intended to explore the interrelationships between dramatic representation and virtual architecture.

Virtual Cuthbert Hall featured narrative events grouped into five themes: *Novice, Work, Death, Quarrel* and *Friendship* (fig. 132, previous page). Each theme referred to experiences illustrative of social and academic life in Cambridge as well as to archetypal emotional situations. The events of each theme represented a particular historical period. For example, the *Quarrel* theme included an academic dispute between 19th-century scholars and vigorous town vs. gown encounters of the 18th century. The *Friendship* theme consisted of traditional college occasions such as a Formal Hall dinner, Lent Bumps rowing races or the post-exam May Balls. Events clustered around significant locations and assembled into narrative sequences. The varied dramatic rhythm of these sequences helped to sustain experients' interest and encourage further exploration.

Through the *Virtual Cuthbert Hall* project, I sought to extend the repertoire of real-time cinematography beyond the typical first- and third-person cameras, to demonstrate how architectural features in virtual environments could support dramatic storytelling, explore how dramatic storytelling could support place-making and develop techniques encouraging experients to explore and perform in virtual environments.

Virtual Cuthbert Hall was unique among my case-studies because it provided an opportunity for experimentation with narrative and drama in a virtual environment unconstrained by practicalities of professional architectural work. This freedom allowed creation of an imaginary college infused with contrasting events designed to challenge representational capabilities of the available technologies and our capacities as storytellers.

As evidence of the investigative designing conducted during this project, I collected development documentation including text, visuals and three-dimensional models. In additions, I produced screen-capture video recordings of interactive sequences and performed

their subsequent close-reading analysis.

We presented *Virtual Cuthbert Hall* and its analysis at many events including International Participatory Design Conference, Malmö 2002; Conference for Technologies for Interactive Storytelling and Entertainment, Darmstadt 2003; New Media Knowledge Synthesising Reality Event at The British Academy of Film and Television Arts, London 2003; Research/Practice/Practice/Research symposium, part of RESPOND!!! Network Exchange, a digital arts and science festival, Cambridge 2003. Publications included Nitsche (Nitsche, et al., 2002a, 2002b, 2003). These public exposures received positive feedback and expressions of interest in further development, learning and collaboration, from architects on one end of the spectrum and game developers on the other.

The *Virtual Cuthbert Hall* project resulted in the successful development of an innovative location-driven narrative structure supported by real-time cinematography. Experimentation with this structure provided a practical confirmation that architectural affordances manipulated through real-time cinematography and situated narrative can act as a rich resource for dramatic engagement. The mediation framework developed for the project proved able to support place-making by influencing forms of places constructed by individual experients. Finally, the project suggested practical techniques able to encourage experients to visit locations, notice objects and recognise unobvious relationships.

Experimentation with three-dimensional rendering engines during the *Virtual Cuthbert Hall* project informed my future work on professional and experimental design of virtual environments. Organisational and narrative techniques developed during the project informed design and implementation of *Virtual Braunstone*, *Virtual West Cambridge* and *A Warning for the Curious*.

A Warning for the Curious

A Warning for the Curious: Detecting the Spirits of King's College (hereinafter *A Warning for the Curious*) is a project that we developed during the Creative Media Production for Model Devices investigative workshop that aimed to explore ideas for utilisation of third-genera-

tion mobile devices. *A Warning for the Curious* developed in response to this challenge is a proof-of-concept prototype of a spatial, narrative thriller-game that uses mobile devices to augment and dramatise physical locations. It encouraged experients to explore an existing physical environment using their mobile telephones as ghost detectors. Governed by a situated narrative structure, the game modified the moving images captured by the cameras of the mobile devices and continuously displayed on their screens. The modifications included various visual effects and additions including textual and pictorial content. The design presumed that experients would wear headphones providing stereo sound coordinated with the moving images. The game goals challenged the experients to explore the spatial context, detect the spirits, disentangle dramatic relationships and survive. The proof-of-concept prototype utilised King's College, Cambridge, as its location.

The team developed the project during a week-long workshop that took place in June 2004.

We designed the virtual component of *A Warning for the Curious* to run on mobile devices with Symbian[12] operating system. A suitable mobile device needed to be able to receive data from The Global Positioning System or its equivalent. It also had to have an inbuilt compass. Such a device could relay locational and directional information to the game system. While NOKIA provided the workshop participants with preproduction models of their devices, they did not have a ready model with such capabilities. However, everyone agreed that such mobile devices would become available in the near future. Having no technological platform or time to develop a fully functional prototype, we decided to prepare a speculative proof-of-concept submission in order to probe into the potential design space. This submission consisted of a script, a design outline and a video presentation. The video presentation documented our exploratory, improvisational simulations of in-the-game performative encounters. We also assembled a technical simulation that demonstrated how real-time image compositing, pattern recognition and interactive control could run

12. http://www.symbian.com

on a mobile device. For the purposes of the proof-of-concept demonstration, the pattern-recognition software ran on a personal computer linked to an off-the-shelf mobile device via a Bluetooth connection.

Mobile May Week took place at the Centre for Applied Research in Educational Technology, University of Cambridge. The Digital Studio, University of Cambridge in collaboration with Crucible Studio and Media Lab's Mobile Hub, University of Art and Design, Helsinki organised the event.

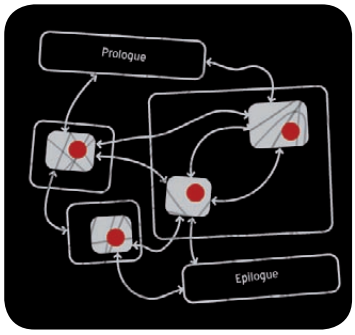


Fig. 133. ***A Warning for the Curious.*** **A simplified conceptual diagram of the narrative structure. Red circles denote narrative units consisting of video and audio scenes delivered on the experient's mobile device. Solid grey rectangles denote transitional zones that we used to alert experients of the proximity of narrative units. These zones also gave access to textual and audio-visual information introducing narrative units. The content of the transitional zones rewarded and guided exploratory behaviour of the experients. Rectangles with grey boundaries denote atmospheric zones. We associated each of these zones with a season and a distinct emotional theme. We used colour manipulations, image overlays and music to represents the seasons and moods. (conceptual diagram)**

The funding for the project was provided by NOKIA.

The team that developed *A Warning for the Curious* included, apart from me, Eduardo Condorcet (then PhD student, The Digital Studios, University of Cambridge), Simon Ruffle (then researcher, Department of Architecture, University of Cambridge), and Lily Shirvanee (then research associate, Massachusetts Institute of Technology Media Lab/ Media Lab Europe). I participated in all stages of the project and in particular was responsible for location-specific design and the assembly of proof-of-concept interactive sequences. The interpretation of the examples for the purposes of this thesis is entirely mine. The workshops took place through the initiative of several people and, notably, that of Maureen Thomas who, together with other participants, provided valuable feedback during design and development of the project.

In the *Warning for the Curious* project, we planned for the game system to be able to communicate to the participants under the influence of their locations and movement. King's College was to contain story-objects that participants could discover with the help of the cameras on their mobile devices. These cameras were to be able to recognise graphic patterns and bar codes. Participants accessed story-objects by engaging with the audio-visual content that they triggered during their explorations. To situate our narrative within the geography of King's College and give dramatic interpretations to its locations, we designed four distinct emotional zones (see fig. 133, this page and fig. 134, next page).

The story began when a visitor to King's College activated a locational trigger and received an invitation to take part in the game. Prologue

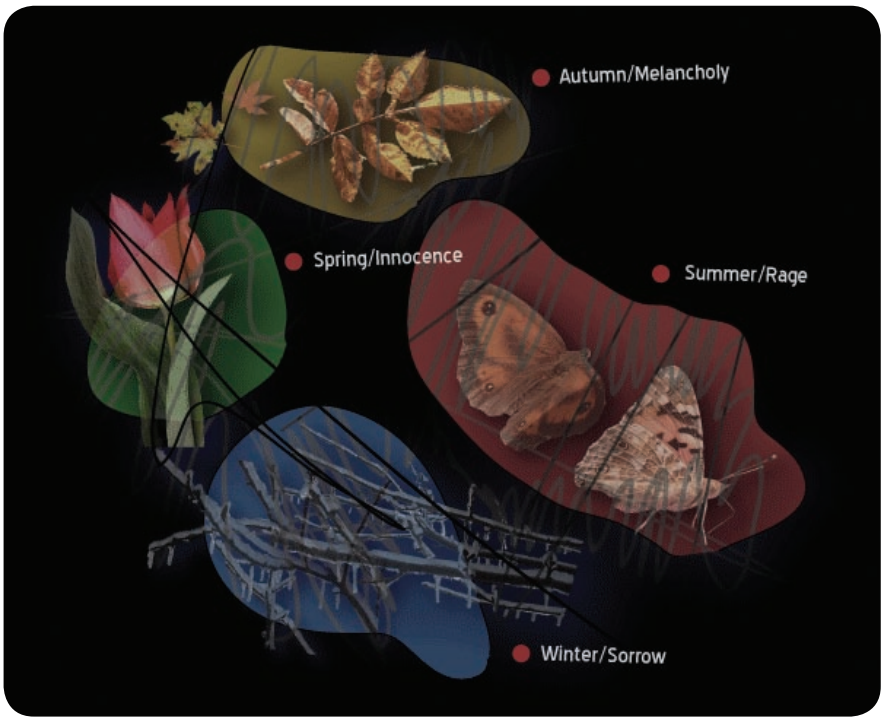


Fig. 134. *A Warning for the Curious.* The concept for the atmospheric zones showing distinct colouring, image themes and moods. (diagram)

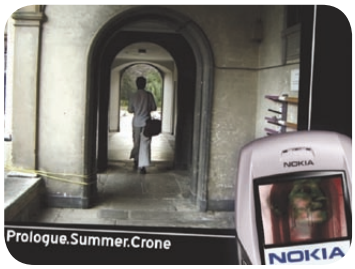


Fig. 135. *A Warning for the Curious.* The image shows the introduction to the game, Prologue. The episode takes place in the Summer zone and the dominant character of the episode is Crone. The larger image shows a player moving through towards a King's college courtyard. The image on bottom right shows what the player can see at this moment on the screen of his mobile phone. The mobile phone shows the image of the passage as seen by its camera and coloured red to indicate that the player approaches a situated narrative node. Closer to the node, the character associated with this part of the narrative also appears on the screen. (moving-image frame)

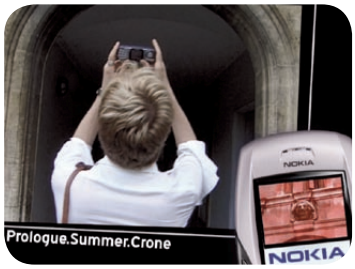


Fig. 136. *A Warning for the Curious.* Prologue. Summer. Crone. The player has arrived to the courtyard and located an object that is known and recognisable to the game system. Such objects could unlock narrative rewards or give hints for further progress. (moving-image frame)

and epilogue, introducing and concluding the narrative bounded the game. We organised story units into a narrative network overlaying physical locations. Through the process of discovery and bodily engagement, the game cast its players as active participants.

For the visual content, we used poetic and suggestive style of representation where animations, visual effects, sounds and music assembled into dynamic collages in response to the spatial behaviour of the experients. We hoped that this approach could interpret the life of King's College and add to it without replacing it with an arbitrary invention.

Taking part in the *Warning for the Curious* project, I sought to consider how deliberate placement of narrative elements could influence subjective construction of places in an existing physical location. The project also allowed me to explore in the context of an interdisciplinary team working on a practice-based project the opportunities offered by the expressive capacities of places. Finally, I aimed to expose the capacities of available or shortly forthcoming consumer-level mobile devices in sustaining situated narrative supported by visual and audio feedback.

The workshop that led to the development of the *Warning for the*



Fig. 137. *A Warning for the Curious.* **The player is in a transitional zone. A textual snippet gives information on the history of a fictional character. In this case it reads: "The Vikings took me away from my family" (moving-image frame)**





Fig. 138. *A Warning for the Curious.* **Proof-of-concept technical test. <top> The mobile telephone's camera registers the colour tag on a player. (photograph) <bottom> The screen of the mobile telephone displays a unit of visual content, in this case the Crone character, associated with this narrative node. For the purposes of the proof-of-concept prototype, we programmed the real-time compositing to take place on a personal computer linked with the mobile telephone via a Bluetooth connection. (photograph of the computer screen)**

Curious was a comparatively short but intensive engagement. Part of our team's work during the workshop was an effort at a visual and artefactual documentation of an open-ended idea-finding exercise. This effort resulted in a collection of textual, pictorial, video and audio content. In my own subsequent analysis, I relied on the materials from this database.

Our team presented the results in a round-table conference at the end of the workshops This presentation allowed us to received feedback from other participants and invited guests. Subsequently, I have discussed the *Warning for the Curious* in multiple informal meetings and public seminars and workshops also gathering valuable feedback for theory-making.

Despite its brevity, the *Warning for the Curious* project generated many useful outcomes that helped me in my thinking and subsequent work. The project exposed my ideas on place to interdisciplinary collaborators, allowed me to engage in an experiential proof-of-concept verification of my ideas on situated narrative and expressive place and provided an environment for exploratory experimentation with collaborative, open-ended, improvisational design strategies for making of hybrid places. This engagement encouraged me to reassess familiar environments from a new standpoint informed by my performative-place approach and conditioned by the capabilities of mobile-device technologies. The project confirmed that situated narrative could guide subjective relational forms of objects and places. Thus, the game system in the *Warning for the Curious* could convert mobile devices owned and familiar to the experients into strange objects with new and intriguing capabilities. Bertolt Brecht's "V-effect" strived toward similar goals by turning objects "from some-thing ordinary, familiar, immediately accessible, into something peculiar, striking and unexpected. [...] Before familiarity can turn into awareness the familiar must be stripped of its inconspicuousness; we must give up assuming that the object in question needs no explanation." (Mitter, 1992, p. 44)

The *Warning for the Curious* project helped to advance my understanding of places as multiplicious, distributed and overlapping. In

addition to that and in combination with other collaborative-design experiences, it provided a positive example of improvisational, responsive, open-ended, in-practice place-making that I later cultivated in *The Parasite* project and hope to develop in my future work.

Virtual Braunstone

Virtual Braunstone is a virtual-environment representation of a Health and Community Centre in the Braunstone Estate near Leicester, UK. *Virtual Braunstone* uses a cartoon-like rendering style that allows for spatial navigation but does not attempt photorealism. In designing *Virtual Braunstone*, we focused on the idea of a navigable three-dimensional environment as a host for visual and audio interactive-content providing place- and action-specific information. Experients access the virtual environment via Tina, a character representing a young mother living on the estate. We organised the content into interactive narrative sequences that feature dynamic, cinematic camerawork and incorporate animated movies, interviews and photographs referring to the functionality and conceptual ideas behind the architectural design of the building. The decisions taken by the visitors and the relationships that they establish in the virtual environment help them to learn about various aspects of the design in visual and experiential ways.

I worked on *Virtual Braunstone* project in 2004 and 2005, simultaneously with the construction of the Braunstone Health and Community Centre.

Virtual Braunstone is a flat-screen real-time three-dimensional environment that can run on an average personal-computer. We distributed the project on CD-ROMs and made information on it accessible via the web. Based on previous experience, we used Virtools as the development platform. The project used a custom three-dimensional player programmed in C++.

The Digital Studio, University of Cambridge served as the hosting organisations for the project.

Funded by Centre for Healthcare Architecture and Design, the National Health Service, UK.

The Centre for Healthcare Architecture and Design of the National

Health Service and, in particular, their Design Excellency unit acted as the client. François Penz (director of The Digital Studio) produced the project and Giorgos Artopoulos (PhD candidate, The Digital Studio) acted as a project leader. Pei Hsu (PhD candidate, The Digital Studio) was responsible for virtual-environment scripting and Oliver Cooper (then a trainee at The Digital Studio) for three-dimensional modelling. Jonathan Mackenzie (then a researcher and programmer, University of Cambridge) contributed to the technical development of the custom player. I contributed work and expertise to all stages of production including general direction, designing, modelling, visual content preparation and programming. In particular, together with Giorgos Artopoulos, I was responsible for the design of interactivity, visual content, narrative structures and the presentation devices.

The Braunstone Health and Community Centre building stands in a particularly troubled area of Leicester. Unemployment in this predominantly white community has been at 90% for several generations. Crime, teenage pregnancy and vandalism are common. This location creates a situation full of tensions, contrasts and drama. The making of a health centre in such a community was a complex challenge that necessitated wide-reaching involvements.

At the time of construction, public facilities in this neighbourhood were non-existent or sparse. The locals burnt down the previous health centre and the architects knew that the new centre could follow suit if rejected by the locals. To gain acceptance, the centre had to be welcoming to the local community. Another group that had to be involved in the project development were the medical professionals who were, among other things, particularly worried about security. None of them lived locally and all wanted to have a secured perimeter to work in. The design had to negotiate the contradicting impulses given by these two groups to extend into the neighbourhood and to isolate from it.

In a situation full of contradictory attitudes, it was particularly important to uncover and involve all potentially affected constituencies. The resulting design was innovative on several levels. Unusually for the current UK practice, the design for the Braunstone Health and



Fig. 139. *Virtual Braunstone.* **A panoramic view of the Braunstone Health and Community Centre under construction. (location photograph)**

Community Centre combined community and health services in one location. The building included a range of medical suites, indoor and outdoor public areas, a café, a police outlet, facilities for social advisors and a pharmacy. The project featured an innovative deep-plan structure with landscaped courtyards.

As the National Health Service's Design Excellency unit's representatives explained to us during the project meetings, the structure of funding and commissioning of buildings within the National Health Service makes architectural innovation difficult. Consequently, the leaders of this unit considered the design of Braunstone Health and Community Centre to be a significant landmark worthy of active dissemination. Innovative engineering included a passive ventilation system and other environment-friendly features. Finally, the design utilised structural and decorative elements to separate different types of visitors and provide security without making the building look like a penitentiary institution. We designed *Virtual Braunstone* to represent these and other characteristics of the design and give a broad range of people access to its experiential characteristics.

My research objectives for the *Virtual Braunstone* project included an ambition to build an interactive environment that could reflect the complex and controversial nature of the life on the Braunstone Estate including its history, its visual and structural character, its position in relationship to the metropolitan Leicester and the diversity of constituents concerned with its future. Furthermore, I aimed to equip *Virtual Braunstone* with a representational apparatus able to support contributions from multiple stakeholders contradicting each other or using incompatible languages. This apparatus had to help retention and exchange of expertise and interpretations between multiple stakeholders involved in hospital construction and attract

constituents from the local community. The latter task is particularly important because, typically, local residents do not know of the opportunities for public consultations, are suspicious of engagement with authorities, do not have the background or language compatible with that of medical or architectural professionals and lack interest in public initiatives. Design experimentation with the representational apparatus aimed to incorporate location- and circumstance-specific content delivery, to experiment with incorporation of situated-narrative structures in the context of an architectural representation and to assess utilisation of a non-photorealistic rendering style in the context of an architectural representation. *Virtual Braunstone* sought to represent experiential characteristics of the building to the people who have never visited it as well as to enhance experiential and tacit knowing of the people who have seen or used the building. The *Virtual Braunstone* project also provided an opportunity to experiment with workflows that could support modularity, easy modification and further development of virtual environments while providing conceptual and technical templates reusable in future projects.

Virtual Braunstone is unique among my case-studies because it provided an opportunity for integration of the ideas and practical knowing developed in the earlier projects such as *Virtual West Cambridge* and *Virtual Cuthbert Hall*. Consequently, *Virtual Braunstone* featured the most sophisticated and flexible narrative structure and multimodal representational apparatus.

The main source of data during the *Virtual Braunstone* project was from my reflection on the design process and from multiple collaborative encounters, discussions and informal interviews with the other stakeholders. Engagement with the project proved to be an intensive learning process in social and technical terms. During this process, I had to adapt and develop my ideas in interpersonal encounters or under the pressures of practical and technical situations. In addition to the in-project observation and note-taking, I analysed selected narrative sequences and observed how other people interacted with them. Public presentations of the project to the other professionals also proved useful as opportunities for feedback-gathering and under-

standing of the *Virtual Braunstone* project's impacts on the opinions and practices of others.

The Design Excellency unit of the National Health Service considered the *Virtual Braunstone* project a success and decided to promote the ideas and techniques that participants generated during its development. They used the materials of the project and the virtual environment for dissemination within the National Health Service. In addition, we presented *Virtual Braunstone* at the National Health Service Design Away Day Panel, The BALTIC Centre of Contemporary Arts, Newcastle, UK, 2005 and at a European seminar on sustainable urban development organised by Scotland Europa, British Council Brussels and Royal Institution of Chartered Surveyors under the title People, Places, Prosperity in Scotland House, Brussels Belgium, 2005.

The *Virtual Braunstone* project resulted in a construction of a fully functional virtual environment that incorporated conceptual and technical developments innovative in the context of an architectural representation including location- and event-specific real-time cinematography, integration of a quest-based situated-narrative structure and non-photorealistic rendering utilised as a hosting environment for multi-modal textual and pictorial content. The project encouraged all of its participants to engage in transdisciplinary learning that was beneficial to all parties and produced reusable workflows and templates for the development of virtual environments.

The workflows developed during the project enabled further practice-based research and created a sound foundation for subsequent implementation into professional practice. In my future work, I intend to use the theoretical understanding and practical techniques developed in the project to construct further architectural representations able to support multiplicious and dramatically-engaging narratives. An example of such future work is a project funded by Arts and Humanities Research Council and entitled Sharing and Visualizing Old St. Peter's: East and West in Renaissance Rome. The project will commence in 2008 and feature reconstructions of places and associated performance staged in the past by pilgrims from a broad range of cultures.